# "A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIMB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI".

**M. Sc (NURSING) DEGREE EXAMINATION**
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**A Dissertation submitted to**

**THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI**

**In partial fulfillment of requirements for the degree of**

**MASTER OF SCIENCE IN NURSING**

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# CERTIFICATE

This is to certify that this dissertation titled, **"A Study To Assess The Effectiveness of Mirror Therapy on Upper Limb Motor Functions Among Patients With Stroke Admitted In Rajiv Gandhi Government General Hospital ,Chennai"** is a bonafide work done by Ms. Durairaj Jothisubbulakshmi, II year M.Sc (N) student , College of Nursing, Madras Medical College, Chennai-03,submitted to **The Tamil Nadu Dr.MGR Medical University, Chennai ,** in partial fulfillment of the award for the degree of Master of Science in Nursing, Branch-I, Medical Surgical Nursing under our guidance and supervision during the academic period from 2014-2016.

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**"A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIBB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT HOSPITAL, CHENNAI".**

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# ABSTRACT


## TITLE

**"A study to assess the effectiveness of mirror therapy on upper limb motor functions among patients with stroke admitted in Rajiv Gandhi Government General Hospital, Chennai."**

Stroke is a major cause of long term physical, cognitive, emotional, social and vocational disability. Mirror therapy is a physical rehabilitation measure which uses a mirror of size 20cm width and 30cm length. Clients are instructed do range of motion exercise with distal joints of affected hand in front of mirror for 30 minutes daily for 4weeks. So the researcher proposed to study the effectiveness of mirror therapy on upper limb motor functions among stroke Clients.

**Need for the study**:

Stroke is one of the most common devastating disorder It causes about 5 million deaths each year in the world. Paralysis is the one of the most common disabilities resulting from stroke. Continuous care and long term rehabilitation therapy is essential for stroke clients to prevent complications and to regain the activities .Mirror therapy is a visual feedback guided imagery therapy. Mirror visual feedback technique is a useful therapy for stroke clients.

**Key words:** stroke, mirror therapy.

**Objectives**

- To assess the demographic variables among clients admitted with stroke.
- To assess the upper limb muscle tone among clients with stoke by using Modified Ashworth Scale among experimental and control group.
- To compare the effectiveness of mirror therapy on upper limb motor functions among patients in experimental group with control group.
- To identify the association between upper limb motor functions and selected demographic and clinical variables among the experimental and control group.

**Methodology**

- **Research design**-Quasi experimental design,pre test -post test only design.
- **Sample size** – 60 clients with acute stroke (30 –Experimental, 30 Control)

- **Research approach**-quantitative approach
- **Sampling technique**-Simple random sampling technique
- **Too**l-Modified Ashworth scale, Brunnstorm's stages of motor recovery

**Data collection procedure:**

Data collection done after approval from ethical committee, consent from participants .Muscle tone and spasticity were score were analyzed by Modified Ashworth Scale and Brunnstorm's stages of motor recovery tool before and after mirror therapy on upper limb motor functions among stroke clients.

**Data Analysis**:

Data were analyzed using descriptive statistics (mean, frequency, standard deviations) and inferential statistics (chi square ,paired 't' test).

**Results:**

The obtained data were analyzed using paired "t‟ test. The result shows that there is significant improvement in hand functioning like wrist flexion, wrist extension, finger abduction, finger adduction. The association of level of gain score with selected demographic variable. Younger, (**$\chi$2=9.19p=0.02),** more educated (**$\chi$2=9.50 p=0.05***) and no other systematic disease clients (**$\chi$2=7.50 p=0.01****) are benefitted more than others. Statistical significance was calculated using chi square test. Hence, it is concluded that Mirror therapy is found to be effective in Cerebrovascular accident patient.

**Discussion:**

Mirror therapy is a visual feedback imagery technique .Mirror therapy is a relatively new therapeutic intervention that focuses on moving the unimpaired limb .Mirror therapy involves performing movements of the unimpaired limbs that creating the visual illusion of enhanced movement capability of the impaired limb.

**Conclusion**

The use of mirror therapy is more effective with continued practice. It would be really beneficial to include the teaching of mirror therapy in their routine daily activity

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**APPENDIX No.** **TITLE**

## ABBREVIATIONS

| | |
|---|---|
| IAT | INTRA ARTERIAL THROMBOSIS |
| ICMR | INDIAN COUNCIL OF MEDICAL RESEACH |
| CT | COMPUTERISED TOMOGRAPHY |
| MRI | MAGNETIC RESONANCE IMAGING |
| H1,H2 | HYPOTHESIS |
| WHO | WORLD HEALTH ORGANIZATION |
| EMRI | EMERGENCY MANAGEMENT OF RESEACH INSTITUTE |
| WSO | WORLD STROKE ORGANIZATION |
| MAS | MODIFIED ASHWORTH SCALE |
| CRPS | COMPLEX REGIONAL PAIN SYNDROME |
| MT | MIRROR THERAPY |
| CT | CONTROL THERAPY |
| TMS | TRANS CRANIAL MAGNETIC STIMULATION |
| NPS | NEUROPATHIC PAIN SCALE |
| RGGGH | RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL |
| CI | CONFIDENT INTERVEL |
| ROM | RANGE OF MOTION |
| DF | DEGREE OF FREEDOM |

# CHAPTER I

## INTRODUCTION

A stroke, sometimes called a brain attack, occurs when a clot blocks the blood supply to the brain or when a blood vessel in the brain bursts. Stroke can be caused by either too little blood to the brain (a ischemic stroke), or too much blood in the skull (a hemorrhagic stroke).

Brain is the functional unit of central nervous system. Any disturbance in the cerebral circulation alters the entire homeostasis. Cerebrovascular accident is defined as the sudden neurological deficit occurs due to decreased (ischemia) blood supply to the brain cell or hemorrhage (Brunner, 2008).

Damage to the brain cause by a stroke may lead to problems with speech as well as movement in a leg or arm. The area that suffers damage and the extent of that damage will depend on which area of the brain was damaged and how badly. Studies show that both physical and mental therapy techniques can be used to improve the patient's responses, and various types of stroke rehabilitation are encouraged to help regain speech and motor functions.

Developing countries like India are facing a double burden of communicable and non-communicable diseases. Stroke is one of the leading causes of death and disability in India. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies. There is also a wide variation in case fatality rates with the highest being 42% in Kolkata. Stroke units are predominantly available in urban areas that too in private hospitals. Intravenous (IV) and intra-arterial thrombolysis (IA) are commonly used in India

Rehabilitation is an active participatory process to minimize the neurological impairment resulting from stroke. The main goal of the

rehabilitation is to return the patient to home and maximize recovery by providing safe, progressive regimen suited to the individual patient. A study conducted among stroke clients found that proper rehabilitation therapy results in better motor recovery. Physical therapy helps to reverse the disabilities caused by stroke.

Stroke rehabilitation typically includes both mental and physical therapy techniques. Clients are encouraged to continue with both in order to combat the damage that has been done to the brain. As well as regular exercise for those areas of the body that have been affected by the effects of stroke, there are other complementary exercises and therapy techniques that can also be considered.

Current research suggests that stroke clients recover the lost function in three ways, overcoming learned non use, learning to use existing redundant neural pathways that don't include damaged brain tissue and the development of neural pathways through brain plasticity.

Mirror therapy is relatively new therapeutic intervention that focuses on moving the unimpaired limb. Mirror therapy works under the principle of development of neural pathways through brain plasticity. Mirror therapy involves performing movements of the unimpaired limbs, while watching its mirror reflection superimposed over the impaired limbs that creating visual illusion of enhanced movement capability of the impaired limb. Mirror therapy is a simple, inexpensive and, most importantly, patient-directed treatment that may improve upper-extremity function.

### 1.1 Need for the study

Stroke is one of the most common devastating disorder. It causes nearly 5 million deaths each year in the world. Stroke is the leading cause of disability in adults. Stroke affects 0.25% of entire population. According to World Health

Organization 15 million peoples suffer stroke worldwide each year, of these, 5 millions are permanently disabled. Stroke is the 3rd largest killer in India. Incidence of stroke in India is around 130 per 10, 0000 people every year.

Paralysis is one of the most common disabilities resulting from stroke. More than 70% of stroke survivor's remains vocationally impaired and more than 30% requires assistance with activities of daily living.

Continuous care and long term rehabilitation therapy is essential for stroke clients to prevent complication and to regain the activities. Among stroke clients 10% require regular care and 60% require physical rehabilitation.

Conventional physical therapies for hemiplegic limbs use active or passive physical exercise in an attempt to stimulate new neural connections that lead to recovery. Mirror therapy is a visual guided motor imagery therapy. A study conducted among stroke clients found that mirror visual feedback is a useful adjunct therapy for paralysis from stroke.

The addition of mirror therapy might enhance recovery by enlisting direct visual stimulation showing the affected limb working, rather than relying on mental imagery alone. A study conducted among stroke clients revealed significant improvement in upper motor functions and activities of daily living among clients those who are underwent mirror therapy when compared with conventional physical therapy.

Other methods of rehabilitation therapy exercises the muscles, the mirror therapy is the only one which exercises brain and nerves. Stroke clients tend to avoid the use of affected limb. Mirror therapy may help to reverse elements of learned disuse of the affected limb.

The effect of mirror visual illusions on brain activity has been investigated in a number of studies. ***Garry et al, 2006*** performed transcranial magnetic stimulation during mirror illusions in healthy subjects and showed

increased excitability of limb function and motor functions among stroke clients.

Mirror Therapy early after stroke is a promising method to improve sensory and Attention deficits and to support motor recovery in a distal plegic limb. So the researcher proposed to study the effectiveness of mirror therapy on upper limb motor functions among stroke clients.

### 1.2 Statement of the problem

**"A study to assess the effectiveness of mirror therapy on upper limb motor functions among clients with stroke admitted in Rajiv Gandhi Government General Hospital."**

### 1.3 Objectives of the study

- To assess the demographic variables among clients admitted with stroke.
- To assess the upper limb muscle tone among clients with stroke by using Modified Ashworth Scale among experimental and control group.
- To compare the effectiveness of mirror therapy on upper limb motor functions among clients in Experimental group with control group.
- To identify the association between upper limb motor functions and selected demographic and clinical variables among the experimental and control group.

## 1.4 Operational definitions

**Effectiveness:**

Effectiveness refers to the extent of the improvement in upper limb motor functions of patient with stoke measured by assessing muscle tone and muscle strength.

**Upper limb motor functions**:

In this refers to the upper limb motor functions which include muscle strength and muscle tone of affected upper limb.

**Stroke**:

Clients with stroke refer to who are having sudden loss of speech, weakness, or paralysis of one side of the body can be *symptoms*.

**Mirror therapy**:

Mirror therapy is refers to physical rehabilitation measure which uses a mirror ,of size 20cm width and 30cm length. Clients are instructed do range of motion exercise with distal joints of affected hand in front of mirror for 15 to 20 minutes two times a day for 14 days

## 1.5 Assumptions

- Stroke clients tend to avoid the use of affected limbs.
- Continuous brain stimulation may improve motor functions among clients with Stroke

## 1.6 Hypothesis

- **H1:** There is a difference in upper limb motor functions among stroke clients of both experimental and control group.
- **H2:** There is a association between gain in upper limb motor function and selected demographic and clinical variables

## 1.7 Delimitation of study

- The sample size for the study is 60 (30 for control and 30 for study groups).
- Data were collected in 4weeks

- Clients with stroke admitted in Rajiv Gandhi Government General Hospital will be studied.
- Clients with stroke, only upper limb dysfunction will participate in this study.

# CHAPTER II

# REVIEW OF LITERATURE

Review of literature refers to an extensive and systematic examination of publications relevant to the research project. Review of literature is a key step in a research process. Nursing research is considered as a continuing process in which knowledge gained from earlier studies is an integral part of research.

According to **Polit and Hungler** the review of literature has defined a broad, comprehensive in depth, systematic and critical review of scholarly publications, unscholarly published print materials, audiovisual materials and visual communications. An extensive review of literature relevant to the research topic was done to gain insight and to collect maximum information for laying the foundation of the study.

**This chapter II is presented under following headings: -**

- **Review of related literature**
- **Conceptual framework**

## 2. 1 Review of related literature

### 2.1.1 Study on incidence of Stroke.

### 2.1.2 Effectiveness of mirror therapy for improving upper hands function in stroke patient.

### 2.1.1 Study on incidence of stroke

**Jeyaraj Durai Pandian et'al, (2013)** Conducted a study to know the epidemiology of stroke in India. Stroke is one of the leading causes of death and disability in India. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies. There is also a wide variation in case fatality rates with the highest being 42% in Kolkata.

**The Hindu health policy and issue article 40507,2012,**A Study conducted among 44 population-based on stroke incidence from 14 different

countries and one multinational, by the WHO .Of these, 16 provided trends analyses on stroke incidence, and seven gave updates of rates of the same populations. Two-thirds of the studies were either from Sweden , the UK , Italy , or Finland, and only four were from East European countries – two from Estonia, and one each from Poland and Lithuania. In total the studies included more than 20 million subjects in the source population. Studies of subtype of stroke suggested that rates of ischemic stroke and intracerebral hemorrhage were higher in men than in women where as rates for subarachnoid hemorrhages were higher in women or no gender differences were reported.

**National Institute of Neurologic disorder or stroke, July (2011)**, A population-based survey on stroke was conducted from different parts of India. During the last decade, the age-adjusted prevalence rate of stroke was between 250-350 people in 1, 00,000 population. Recent studies showed that the age-adjusted annual incidence rate was 105/100,000 in the urban community of Kolkata and 262/100,000 in a rural community of Bengal. The ratio of cerebral infarct to hemorrhage was 2.21. Hypertension was the most important risk factor. Stroke represented 1.2% of total deaths in India. The gender ratio of death due to stroke was 1.24 One would expect a high mortality of stroke with low prevalence and median annual incidence of stroke in India.

**Gazihan Alankus, et'al, April (2010), Atlanta.** A study conducted by BBC at Karnataka, Learn to identify a brain stroke and ensure the victim reaches a hospital within six hours. Stroke, also called brain attack or paralysis, is the second leading cause of death in those aged over 60, and the fifth leading cause in those between 15 and 59 years.According to the World Stroke Organization (WSO), one in every six individuals can have a stroke during their lifetime and that is why the WSO has launched the ‘One in Six' campaign this year.

**Torgier Bruun Wyller.(2002),** Stroke could soon be the most common cause of death worldwide. Stroke is currently the second leading cause of

death in the Western world, ranking after heart disease and before cancer, and causes 10% of deaths worldwide. The incidence of stroke increases exponentially from 30 years of age, and etiology varies by age. Advanced age is one of the most significant stroke risk factors. 95% of strokes occur in people age 45 and older, and two-thirds of strokes occur in those over the age of 65.However, stroke can occur at any age, including in childhood. Men are 25% more likely to suffer strokes than women, yet 60% of deaths from stroke occur in women. Since women live longer, they are older on average when they have their strokes and thus more often killed (NIMH 2002).

### 2.1.2 Effectiveness Of Mirror Therapy For Improving Upper Hands Function In Stroke Patient.

**Aishath Najiha, et' al., (2015)**, Saveetha College of physiotherapy, Chennai. All randomized controlled trials (RCTs), cohort, case controlled studies, single case studies and case series were used in evaluating the clinical aspects of mirror therapy. All age groups and both sexes were included for selection of reviews. Only physiotherapy intervention has been included, Forty-three chronic stroke clients with mild to moderate upper extremity received MT + MG, MT, or CT for 1.5 hours/day, 5 days/week for 4 weeks. Results show MT + MG and MG with reduced motor impairment and synergistic shoulder abduction more than CT. The articles reviewed showed a trend that mirror therapy is effective in stroke, phantom limb pain, complex regional pain syndrome, cerebral palsy and fracture rehabilitation.

**Sneha S. Khandare, et' al., (2013),** (Postgraduate student, College of Physiotherapy, PIMS, conducted a study on Comparison of Task Specific Exercises and Mirror Therapy to Improve Upper Limb Function in Sub acute Stroke Clients. This study was a prospective comparative study. Participants were recruited from the Neurophysiotherapy department, Pravara Institute of Medical Sciences, Loni, The results were concluded to be statistically significant with $p < 0.01$. When a significant difference was found between the

three groups, a multiple Comparison Test was applied to reveal which groups differ significantly from each other.

**Anees Fathima, April, (2012)**, an interventional study was conducted to assess the effect of mirror therapy on Cerebrovascular accident patient hand function in Sri Ramakrishna Hospital, Coimbatore. Quasi experimental study Pretest and Posttest with control group were used to conduct the study. The result shows that there is significant improvement in hand functioning like wrist flexion, wrist extension, finger abduction, finger adduction. Hence, it is concluded that Mirror therapy is found to be effective in Cerebrovascular accident patient.

**Oujamaa L et' al., (2011)** reviewed 66 studies. The main therapeutic strategies they found activation of the ipsilesional motor cortex, inhibition of the contralesional motor cortex and modulation of the sensory afferents. This path physiological mechanism could explain the positive impact of constraint-induced movement therapy (CI therapy) in an environmental setting for chronic stroke clients. This literature review shows that exercising the hemi paretic hand and wrist is essential in all stages of a stroke rehabilitation program. New data stemming from neurosciences suggest that ipsilesional corticospinal excitability should be a priority Mirror therapy has shown positive effects in the treatment of stroke rehabilitation and complex regional pain syndrome. It also shows positive effects on hand and foot rehabilitation following an injury or surgery

**Rothgangel AS et al., (2011)** reviewed clinical aspects of mirror therapy in rehabilitation They found little is known about which clients are likely to benefit most from MT, and how MT should preferably be applied. Future studies with clear descriptions of intervention protocols should focus on standardized outcome measures and systematically register adverse effects [12]. More research is needed to determine the optimal dose of therapy, optimal time to start this intervention, and the right target group. Accordingly, no firm

conclusions can now be drawn on the effectiveness of MT until more evidence is present.

**Ramachandran VS, et' al., July (2009)**, Center for Brain and Cognition, University of California, San Diego conducted a study on the use of visual feedback, in particular mirror visual feedback, in restoring brain function. This article reviews the potential use of visual feedback, focusing on mirror visual feedback, introduced over 15 years ago, for the treatment of many chronic neurological disorders that have long been regarded as intractable such as phantom pain, hemi paresis from stroke and complex regional pain syndrome. If so, relatively simple therapies can be devised--of which mirror visual feedback is an example- to restore function.

**Stoykov ME, et' al., (2009),** Rehabilitation Institute of Chicago, Chicago, IL. Upper extremity hemi paresis is the most common post-stroke disability. Longitudinal studies have indicated that 30-66% of stroke survivors do not have full arm function 6 months post-stroke. Bilateral arm training has been investigated as a potential rehabilitation intervention. Bilateral arm training encompasses a number of methods including: (1) bilateral isokinematic training; (2) mirror therapy using bilateral training; (3) device-driven bilateral training; and (4) bilateral motor priming. Neural mechanisms mediating bilateral training are first reviewed. The key bilateral training studies that have demonstrated evidence of efficacy will then be discussed. Finally, conclusions are drawn concerning clinical implications based on the reviewed literature.

**Ezendam D, et' al., May, (2009)**, Center for Human Movement Sciences, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands. Did a systematic review of the effectiveness of mirror therapy in upper extremity function. two studies focused on mirror therapy after an amputation of the upper limb, five studies focused on mirror therapy after stroke, five studies focused on mirror therapy with complex regional pain syndrome type 1 (CRPS1) clients, one study on mirror therapy

with complex regional pain syndrome type 2 (CRPS2) and two studies focused on mirror therapy after hand surgery other than amputation.

**Cacchio, et' al., May, (2009)** conducted a study on Mirror Therapy in Complex Regional Pain Syndrome Type 1 of the Upper Limb in Stroke Clients. Complex regional pain syndrome type 1 (CRPS1) of the upper limb is a painful and debilitating condition, frequent after stroke, and interferes with the rehabilitative process and outcome. The mean scores of both the primary and secondary end points significantly improved in the mirror group ($P < .001$). No statistically significant improvement was observed in any of the control group values ($P > .001$). Moreover, statistically significant differences after treatment ($P < .001$). The results indicate that mirror therapy effectively reduces pain and enhances upper limb motor function in stroke clients with upper limb CRPS1.

**Daniëlle Ezendam, et' al, (2009)** This review gives an overview of the current state of research regarding the effectiveness of mirror therapy in upper extremity function.systematic literature search was performed to identify studies concerning mirror therapy in upper extremity. The included journal articles were reviewed according to a structured diagram and the methodological quality was assessed. .Fifteen studies were identified and reviewed. Five different patient categories were studied: two studies focussed on mirror therapy after an amputation of the upper limb, five studies focussed on mirror therapy after stroke, five studies focussed on mirror therapy with complex regional pain syndrome type 1 (CRPS1) clients, one study on mirror therapy with complex regional pain syndrome type 2 (CRPS2) and two studies focussed on mirror therapy after hand surgery other than amputation. .

**Dohle C, et' al, April, (2009)** Mirror therapy promotes recovery from severe hemiparesis: a randomized controlled trial. Rehabilitation of the severely affected paretic arm after stroke represents a major challenge,

especially in the presence of sensory impairment. Thirty-six clients with severe hemi paresis because of a first-ever ischemic stroke in the territory of the middle cerebral artery were enrolled, no more than 8weeks after the stroke. MT clients regained more distal function than CT clients.MT early after stroke is a promising method to improve sensory and attention deficits and to support motor recovery in a distal pelagic limb.

**McCabe CS, et' al. April, (2008)**, conducted a study on Mirror visual feedback for the treatment of complex regional pain syndrome (type 1) in The Royal National Hospital for Rheumatic Diseases, Upper Borough Walls, Bath, BA1 1RL, UK. Mirror visual feedback was originally devised as a therapeutic tool to relieve perceived involuntarily movements and paralysis in the phantom limb. This review describes how mirror visual feedback was first developed with amputees, its original application in CRPS, and how further research has demonstrated its potential benefit within graded motor imagery programs. We discuss the potential mechanisms behind this technique and consider the implications for clinical practice.

**Yavuzer G. et' al, March (2008),** conducted a randomized controlled trial that Mirror therapy improves hand function in sub acute stroke at Department of Physical Medicine and Rehabilitation, Ankara University Faculty of Medicine, Ankara, The Brunnstrom stages of motor recovery, spasticity assessed by the Modified Ashworth Scale (MAS),and hand-related functioning (self-care items of the FIM instrument).The FIM self-care score improved more in the mirror group than in the control group after 4 weeks of treatment (by 0.83, 0.89, and 4.10, respectively; all $P<.01$) and at the 6-month follow-up (by 0.16, 0.43, and 2.34, respectively; all $P<.05$). No significant differences were found between the groups for the MAS.

**Altschuler EL, et' al, (2008),** Mirror therapy in a patient with a fractured wrist and no active wrist extension at Department of Physical Medicine and Rehabilitation, University of Medicine and Dentistry of New Jersey, New York. A randomized control trail clients in whom mirror therapy,

training moving both hands while watching the reflection of the present or good hand in a parasaggital mirror - a method used for phantom limb and stroke clients, Results show that MT was extremely useful after a fractured wrist with good passive, but no active, extension.

**Sütbeyaz S, et' al., (2007)** Research Hospital, Ankara, Turkey conducted a experimental study to evaluate the effects of mirror therapy, using motor imagery training, on lower-extremity motor recovery and motor functioning of clients with sub acute stroke. The results showed significantly more improvement at follow-up in the mirror group compared with the control group.

**Ertelt D, et' al., (2007),** Department of Neurology and Neuroimage Nord, University Hospital Schleswig-Holstein, Campus Lübeck, Germany. Evidence exists that the observation of actions activates the same cortical motor areas that are involved in the performance of the observed actions. A significant improvement of motor functions in the course of a 4-week treatment, as compared to the stable pre-treatment baseline, and compared with a control group have been found. Results provide pieces of evidence that action observation has a positive additional impact on recovery of motor functions after stroke by reactivation of motor areas, which contain the action observation/action execution matching system.

**De Vries S, et' al., (2007)**, Centre for Human Movement Sciences, University Medical Centre Groningen, conducted an experimental study on Motor disorders is a frequent consequence of stroke and much effort is invested in the re-acquisition of motor control. Although clients often regain some of their lost function after therapy, most remain chronically disabled. The results show that the motor system can also be activated "offline" by imagining (motor imagery) or observing movements.

**Altschuler EL.(2005),** Department of Physical Medicine and Rehabilitation, University of Medicine &Dentistry of New Jersey, USA.This study striking effect that vision can have on movement: when a person makes circular motions with both hands, clockwise with the left hand, counterclockwise with the right hand, while watching the reflection of one hand in a parasagitally placed mirror, if one arm makes a vertical excursion, the other arm tends to make the same vertical excursion. This observation may help in understanding how visual feedback via a mirror may be beneficial for rehabilitation of some clients with movement deficits secondary to certain neurologic conditions, and illustrates that the traditional division of neural processes into sensory input and motor output is somewhat arbitrary.

**Ramachandran VS. (2005),** Center for Brain and Cognition, University of California at San Diego, La Jolla an experiment study on clients with phantom limbs suggest that neural connections in the adult human brain are much more malleable than previously assumed. Three weeks after amputation of an arm, sensations from the ipsilateral face are referred to the phantom; this effect is caused by the sensory input from the face skin 'invading' and activating differenced hand zones in the cortex and thalamus.

**Rosen B, et' al., (2005),** Department of Hand Surgery, Malmo University Hospital, Malmo, Sweden. Training with a mirror in rehabilitation of the hand Treatment with a mirror gives an illusion of function in a missing or nonfunctioning hand. The method is based on the concept that the central representation of phantoms and body image can change rapidly, and has been described in the treatment of phantom pain and stroke. The results show that the evidence on improve the hand function after mirror therapy in rehabilitation after hand surgery.

**Garry MI, et' al., (2005)** School of Psychology, University of Tasmania, Hobart, Tasmania, Australia. Conducted an experimental study on Primary motor cortex (M1) excitability is modulated by both ipsilateral limb

movement and passive observation of movement of the contra lateral limb. The hypothesis was tested in the present study using single-pulse transcranial magnetic stimulation (TMS) in eight neurologically healthy subjects. MEPs were significantly enhanced during ipsilateral hand movement compared with the Rest condition ($P<0.05$

**Gaggioli A, et'al., (2004), Applied** Technology for Neuro-Psychology Lab, Institute Auxologico Italian, Milan, Describe a clinical protocol in which they use interactive tools to stimulate motor imagery in hemiplegic stroke clients, thereby helping them to recover lost motor function. The protocol consists of an inpatient and an outpatient phase, combining physical and mental practice. After the clinical protocol, the clients use a portable device to guide mental and physical practice in a home setting. Therefore increasing the speed and/or effectiveness of learning, and (d) the use of interactive technology will reduce the patient's need for skilled support, therefore improving the cost-effectiveness of training.

**Moseley GL. (2004)**, Department of Physiotherapy, The University of Queensland and Royal Brisbane and Women's Hospital, Herston, conducted a randomized controlled trial in Complex regional pain syndrome type 1 (CRPS1) involves cortical abnormalities similar to those observed in phantom pain and after stroke. The results uphold the hypothesis that a MIP initially not involving limb movement is effective for CRPS1 and support the involvement of cortical abnormalities in the development of this disorder.

**Stevens JA, et' al., (2003)**, using motor imagery in the rehabilitation of hemi paresis. Sensory Motor Performance Program, examine the effectiveness of using motor imagery training in the rehabilitation of hemi paresis. Through this experimental study two survivors of embolic middle cerebral artery stroke that resulted in chronic hemi paresis. A motor imagery training program consisting of imagined wrist movements (extension, pronation-supination) and mental simulations of reaching and object manipulation making use of a mirror

box apparatus. These results demonstrate the potential for using motor imagery as a cognitive strategy for functional recovery from hemi paresis.

**Sathian K, et' al., (2000)** Department of Neurology, Emory University School of Medicine, 1639 Pierce Drive, Arm amputees can experience the perception of movement of a phantom limb while looking at a mirror reflection of the moving, Such use of a mirror to provide illusory visual feedback of movement can be useful in rehabilitation of hemi paretic clients. In this case report, we describe the successful application of "mirror therapy" to the post-stroke rehabilitation of a patient with poor functional use of an upper extremity, due mainly to somatosensory deficits. Mirror therapy facilitated employment of a motor copy strategy (bimanual movements) and later progression to "forced use" of the affected arm. The end result was increased functional use of the affected upper limb.

**Ramachandran VS, et 'al., (1999)** Brain and Perception Laboratory, UCSD conducted a study on a new technique that might help accelerate recovery from neglect. In pilot experiments, two types of responses were seen: (a) in one subset of clients the presence of the mirror seemed to enhance the clients' awareness of the neglected field, so that they reached correctly for an object that was shown in the neglected field. Will repeated practice with this task accelerate recovery from neglect? (b) The second group of clients kept reaching into the mirror to grasp the reflection or kept groping behind the mirror ('mirror agnosia'). We believe this technique might provide a new approach for the treatment of visual hemi neglect

## 2.2 Conceptual Frame Work

Conceptual framework is a group of concepts and set of proportion that spells out the relationship between them. Conceptual framework, conceptual model, or conceptual scheme deals with abstractions that are assembled by virtue of their relevance to a common theme; conceptual framework plays several interrelated roles in the progress of science. It serves as a springboard for the generation of research hypothesis and can provide an important concept for scientific research. The conceptual framework facilitates communications and provides a systematic approach to nursing research, education and administration.

The present study aims at evaluating the efficacy **Mirror therapy on upper limb motor functions among clients with stroke admitted in Rajiv Gandhi General Hospital, Chennai.**

The conceptual framework for this study is developed by the investigator based on modified Donabedian's System model. The focus of this theory is the adaptation of the individual to stimuli, from the environment from within. Each component has a direct influence on the next, as represented by the arrows in the following schematic (Donabedian, 1980):


**Structure** refers to the attributes of the settings in which providers deliver health care, including material resources (e.g. mirror therapy), human resources and organizational structure.

**Process** of care denotes what is actually done to the patient in the giving and receiving care. Building on the example above, the provider could receive whether an eligible patient has been practiced on the mirror therapy on

unaffected limbs and realizing the benefits of it's on the affected hand functions.

Maximum improvement of hand function is the **outcomes** or the direct result of acute stroke patient's underwent mirror therapy. The clients practicing mirror therapy will have improve motor functions of the affected hands.

In this study, the structure includes the human resource like demographic variable and questions related to medical condition.

Process includes pre-intervention on teaching mirror therapy to the clients who are admitted with acute stroke and post assessment of hand functions with the help of Brunnstrom's scale and Modified Asworth Scale.

The output is marked improvement in hand functions, among the stroke clients who practice the Mirror Therapy when compared with the clients in control group (the clients do not practice the Mirror therapy). This was assessed by Brunnstrom scale and Modified Asworth Scale.

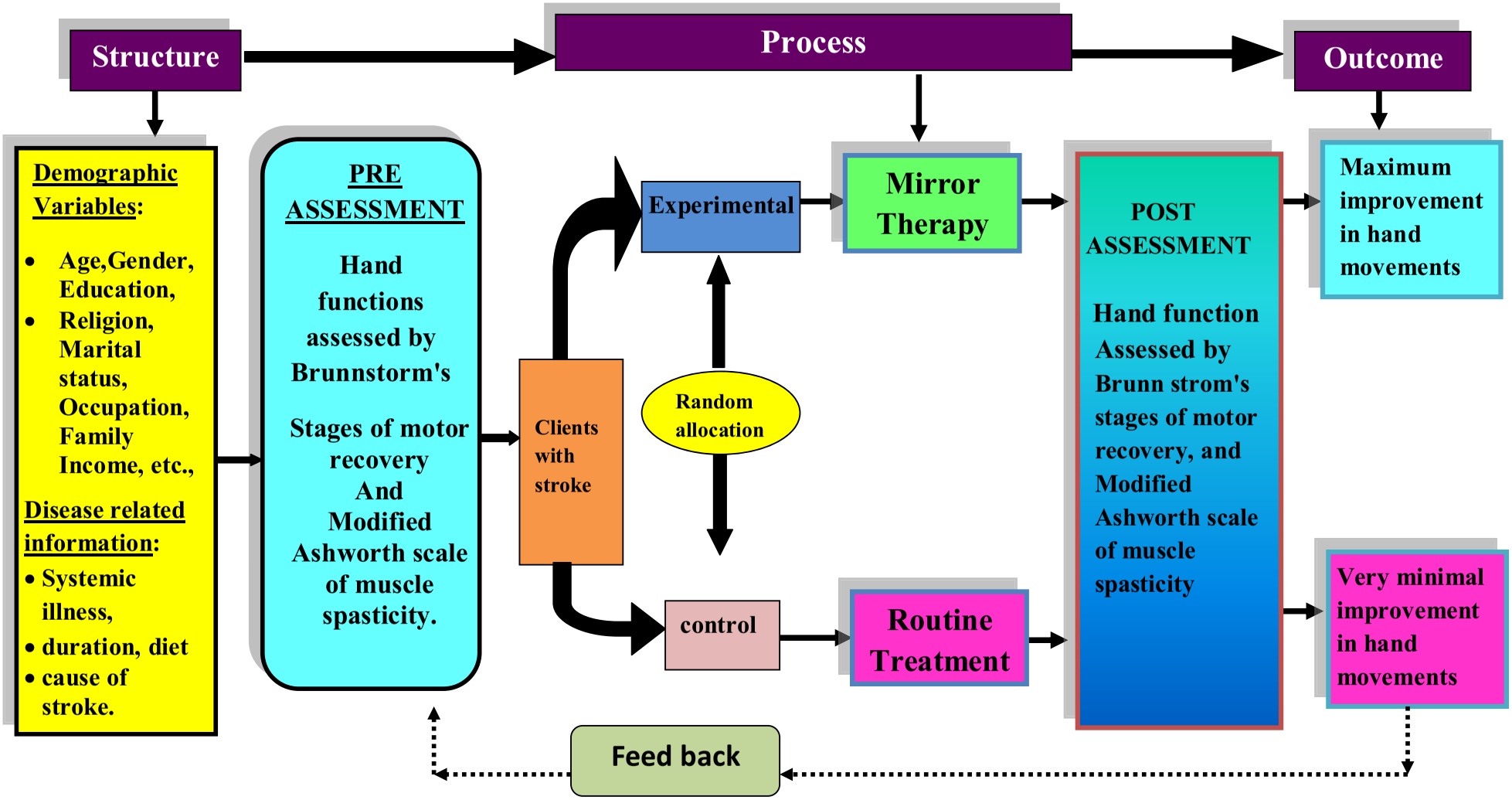


**Figure 1: Conceptual Frame work –Modified Donabedian's Model**

# CHAPTER III
# RESEARCH METHODOLOGY

The methodology of research indicates the general pattern of organizing the procedure for gathering valid and reliable data for the purposes of investigation.

**Polite and Hunger 2003**

## Methodology

This chapter deals with the description of research methodology adopted by the investigator. Methodology is a systematic way to solve research problems. Research methodology provides a brief description of the method adopted by the investigator in the study. The methodology of research refers to the principles and ideas on which the researchers base their procedures and strategies. It includes the research approach, design, population, sampling, technique, development description of the tools and intervention, pilot study report, procedure for data collection and data analysis.

Research methodology involves the systematic procedure by the researcher, which starts from initial identification of the problems to its conclusion. The study conducted is to assess the effectiveness of Mirror therapy for improving upper limb function among stroke subjects.

## 3.1 Research approach

Quantitative approach was used for this study. A research approach tell the research about the collection of data that is, what to collect, when to collect, how to collect and how to analyses. It also helps the researcher with suggestions of possible conclusion to be drawn from the data.

## 3.2 Duration of the study

The duration of the study is about four weeks. This study was conducted from 16.07.2015 to 15.08.2015

## 3.3 Study Setting

Study was conducted in selected departments at Rajiv Gandhi Government General Hospital, (Medical ward and Neurology ward) Chennai. The Government General Hospital was started on 16 November 1664 as a small hospital to treat the sick soldiers of the British East India Company. The foundation stone of the institute of Neurology within this Government General Hospital complex was laid on 8th March 1968 by the late Chief Minister of Tamil Nadu. This institute in an earlier era trained 40% of neuro scientists in this country and now is responsible for and continues to shoulder an almost similar burden towards this state of Tamil Nadu even to this day. The bed strength of RGGH is above 3000. In medical ward, there are 250 beds. Bed Strength of Department Neurology is 150, and Neurosurgery is 150.

## 3.4 Research design

The research design adopted for the study is “Experimental study design" two group pre-assessment and post assessment design. The research design is a plan, structure and strategy of investigations and answering the research question. It is an overall plan or the blue print, the researcher select to carry out the study.

| GROUP | Pre Assessment | Intervention | Post Assessment |
|---|---|---|---|
| Experimental Group | $O_1$ | X | $O_2$ |
| Control Group | $O_3$ | ---- | $O_4$ |

$O_1$ – Pre - Assessment of Spasticity score and hand function in Experimental Group

$O_2$ – Post - Assessment Spasticity score and hand function in Experimental Group

X – Mirror therapy in Experimental group

$O_3$ – Pre – assessment Spasticity score and hand function in Control group

$O_4$ – Post – assessment Spasticity score and hand function in Control group

---- - Only routine care

**Intervention protocol**

| Protocol | Experimental group | Control group |
|---|---|---|
| Place | Selected wards in RGGGH | Selected wards in RGGGH |
| Tool | Brunnstrom stages Score, Modified Asworth Scale | Brunnstrom stages Score, Modified Asworth Scale |
| Intervention | Mirror therapy | Routine care |
| Duration of intervention | 15 To 20 minutes per day for fifteen days | |
| Frequency | Two times a day | |
| Time | 8.00am and 2.30 pm | |
| Administrator | Investigator | |

### 3.5 Study Population

The population for the study consists of conscious subjects admitted with stroke of upper limbs in selected wards in Rajiv Gandhi Government General Hospital, Chennai.

### 3.6 Sample Size

The sample size for this study was 60 clients (30 in control group and 30 in experimental group).

### 3.7 Sampling criterion

#### 3.7.1 Inclusion criteria

Clients who are

- Having CT evidence of acute stroke.
- Willing to participate in the study
- Available during the time of study
- Clients who are able to understand read and speak Tamil

#### 3.7.2 **Exclusion criteria**:

Stroke clients who are:

- Unconscious
- Quadriplegic

### 3.8 Sampling technique

Simple Random sampling technique was used in this study. Subject was randomly assigned to Experimental and Control group by lottery method

### 3.9 Research variables

The categories of variable discussed in this study were

- **Independent variable:** Mirror therapy.
- **Dependent variable:** Level of improvement in hand movements and function.

### 3.10 Development and description of tool

Data collection tools are the instruments used by the researcher to observe or measure the key variables in the research problems.

### 3.10.1 Development of tools

The tool for data collection was formulated by the investigator by consulting the experts in Nursing, Medical and statistical experts. The tool has three section with demographic variables, medical related information and The level of hand motor function was analyzed by using Modified Ashworth scale – for spasticity (Bryan Ashworth, 1964). Brunnstrom recovery stage of hand – for recovery of hand movement (Signe Brunnstrom, 1966).

### 3.10.2 Description of tool

Tools for data collection:

Tool is divided into three parts:

Section A: Demographic and clinical variable

Section B: Part: 1 Modified Ashworth scale

Part :2 Brunnstrom's of motor recovery

**Section:A**

***Demographic Data*:** Demographic data consists of personal information about the patient such as age of the patient, sex, education, occupation and dietary habit.

**Disease related information-Data –** this includes, history of systemic diseases, meaning of stroke, causes of stroke etc.

**Section:B**

**Part:1**

***Modified Ashworth Scale**:* The Ashworth scale was created in the mid 1964 by Bryan Ashworth as a way of judging the effectiveness of anti-spastic drugs. The modified Ashworth scale was created in 1987 by researchers Bohannon and smith who introduced a 1+ grade to increase the sensitivity of

the scale. A rating of four on the modified scale is described as rigidity with in the affected area of the body with movement limited when extended or in flexion. When a score of 0 is recorded on the modified Ashworth scale there is usually no increase in a clients muscle tone. The Ashworth scale is being used to measure the muscle tone on both the upper and lower areas of the body. The scale rates the ease of movement from maximal flexion to maximum extension.

***Administration*** Although there are no standardized guidelines for its use, the modified Ashworth scale can be applied to muscles of both the upper or lower body. The rater should extend the clients limb from a position of maximal flexion to maximal extension until the first soft resistance is felt. Moving a client's limb through its full range of motion should be done within one second by counting one thousand and one (Bohannon & Smith, 1987). Throughout testing the client should be instructed to remain calm and relaxed and when repeated testing is undertaken, testing should be initiated at the same time of the day to minimize possible changes in spasticity levels due to medication interaction (Bohannon & Smith, 1987).

**Part :2**

***Brunnstrom Motor Recovery Stages****:* The Brunnstrom approach developed by Swedish physical therapist Signe Brunnstrom. She was a physical therapist emphasizing the synergetic pattern of movement which develops during recovery from hemiplegia. Brunnstrom (1966 & 1970) described the process of recovery following stroke-induced hemiplegia. The process was divided into a number of stages: Synergy: A whole series of muscles are recruited when just a few are needed. Trying to reach forward, the arm wings outward, the shoulder lifts, the wrist curls down. Lots of this is from spasticity.

1. **Flaccidity** (immediately after the onset)

   No voluntary movements on the affected side can be initiated.

2. **Spasticity appears**

   Basic synergy patterns appear. Minimal voluntary movements may be Present.

3. **Patient gains voluntary control over synergies**

Increase in spasticity.

4. **Some movement patterns out of synergy** are mastered (synergy patterns still Predominate). Decrease in spasticity.

5. **If progress continues**, more complex movement combinations are learned as the basic synergies lose their dominance over motor acts.

Further decrease In spasticity.

6. **Disappearance of spasticity**

Individual joint movements become possible and coordination approaches normal.

7**. Normal function is restored**

### 3.10.3 Content validity

Validity of the tool was assessed using content validity. Content validity was determined by Nursing and Medical experts. They agreed this tool for assessing effectiveness of Mirror therapy improving upper limb functions among subjects admitted in Neurology wards at Rajiv Gandhi Government General Hospital, Chenna.

## 3.11 Ethical Consideration

This study was conducted after the approval from the Ethical committee of, Madras medical College, Chennai. Permission was obtained from Professor and HOD of the Neurology Department and Director of the Internal Medicine. All subjects were carefully informed about the purpose of the study and their part during the study and how the privacy was guarded. Confidentiality of the study results was ensured. The freedom was given to the subjects to leave the study at his/her will without assigning any reason. No routine care was altered or withheld. Thus the investigator followed the ethical guidelines which were issued by the research committee. Written permission was obtained from all subjects.

### 3.12 Pilot study

A formal permission was obtained from the Professor and HOD of Neurology, Rajiv Gandhi Government General Hospital, Chennai, and content validity from the experts, the study was conducted in selected wards at Rajiv Gandhi Government General Hospital, Chennai. The subjects who are having stroke were selected using purposive sampling technique. Among 6 subjects, 3 subjects were in Experimental Group and the other 3 in Control group. Informed written consent was obtained from the subjects. Mirror therapy was administered to Experimental group. Analysis of the study showed positive correlation between Mirror therapy and hand movements study was practically feasible. The instrument was found reliable for proceeding with the main study. The scores were found to be significant at 5% ($p<0.05$) level. The findings of the pilot study revealed that the study is feasible.

### 3.13 Reliability of the tool

After pilot study reliability of the tool was assessed by using interrater method and its correlation coefficient coefficient r –values are 0.85(modified Asworth scale of muscle spasticity) and 0.86(Brunn storm's stages of motor recovery). These correlation coefficient is very high and it is good tool for assessing effectiveness of Mirror therapy for improving hand movements in stroke subjects admitted in selected wards at Rajiv Gandhi Government General Hospital, Chennai.

### 3.14 Data collection procedure

A formal permission was obtained from the Dean, Ethical committee, Professor and Head of the Department of Neurology, and Director and HOD Of Internal Medicine Rajiv Gandhi Government General Hospital, Chennai. As per inclusion and exclusion criteria the subjects were selected by using on non probability convenient sampling method and subjects are divided into Experimental and Control groups. Subjects selected for pilot study were excluded. The study purpose and method were explained to each subject and

informed written consent was obtained. Confidentiality was assured to all the subjects. The information regarding demographic profile and pre assessment was done for 60 subjects by interviewing them and observing health records. The Hand function was assessed by Modified Ashworth Scale, and Brunnstrom stage of recovery.

Pre assessment score was measured in both Experimental and Control group on first day. The intervention, mirror therapy two times a day was given to Experimental group for 20 minutes. Intervention was done at the bedside. Adequate privacy was provided during the procedure. Control group received routine treatment. The post-assessment score was done on 14th or $15^{th}$ day with the same Scale in both groups. Approximately the time taken for the intervention daily for single subject is 15 to 20 minutes. The evidence of intervention and level of hand function improvement were marked.

### 3.15 Data entry and analysis

The data were analysed in terms of the objectives of the study using descriptive and inferential statistics.

**Descriptive statistics include**

- Frequency and percentage distribution of demographic profile and medical related information.
- Mean and standard deviations of pre assessment and post assessment scores.

**Method of Data Analysis & Interpretation**

- The researcher used appropriate statistical techniques for data analysis and present in the form of tables, graphs and diagrams.
- Demographic data are analysed by frequency and percentage distribution.

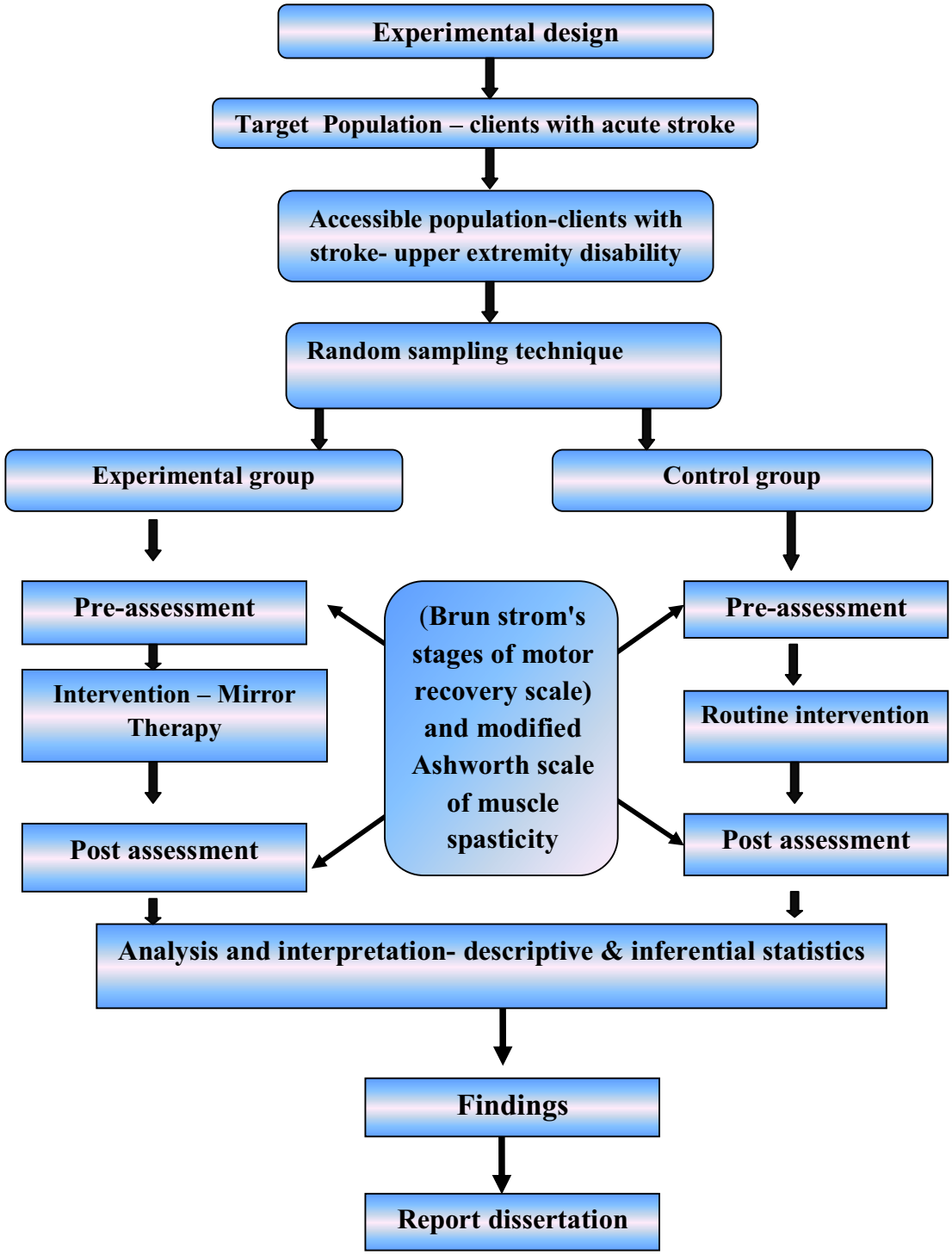


**FIGURE 2 SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY**

# CHAPTER –IV

## DATA ANALYSIS AND INTERPRETATION

Analysis is the appraisal of the data and interpretation of the data consisting of relation between the findings of the study to the research problem and theoretical framework of the study. An important function of the process of interpretation is to link the findings of the study to the main stream of scientific knowledge in the field.

This chapter deals with data analysis of effect of mirror therapy on hand functioning among stroke clients at Rajiv Gandhi Government General Hospital, Chennai. Data was collected from 60 clients. Data collected were tabulated and analyzed using descriptive and inferential statistical method.

**Statistical analysis:**

- Demographic variables in categorical/dichotomous were given in frequencies with their percentages.
- Brunn storm's stages of motor recovery score and modified ashworth scale of muscle spasticity was given in mean and standard deviation.
- Association between level of upper limb motor functions gain score and demographic variables were analyzed using chi square test.
- Difference between pretest and posttest was analyzed using student paired t-test.
- Difference between experiment and control was analysed using student unpaired t-test.
- Differences between pretest and posttest score was analyzed using percentage with 95% CI and mean difference with 95% CI.
- Simple bar diagram, Multiple bar diagram, scatter plot with regression estimate were used to represent the data.
- $P<0.05$ was considered statistically significant.

**Organization of Data:**

**Section A :** Distribution of the subjects according to their demographic Profiles

**Section B :** Pretest Level of Brunnstrom's of Motor Recovery Score And Pretest Level of Modified Ashworth Scale of Muscle Spasticity Score

**Section C :** Post test Level of BrunnStrom's Of Motor Recovery and Posttest Level of Modified Ashworth Scale of Muscle Spasticity Score.

**Section D :** Ccomparison of experimental and control group Brunn stroms stages of motor recovery score and Comparison Of Modified Ashworth Scale of Muscle Spasticity

**Section E :** Effectiveness of Mirror therapy

**Section F:** Association between level of improvement in hand function And selected demographic Variables.

## Section A : Distribution of the subjects according to their demographic profiles

**Table 1 Demographic profiles of the study variables**

| Demographic variables | | Group | | | | Chi square test |
|---|---|---|---|---|---|---|
| | | Experiment | | Control | | |
| | | f | % | f | % | |
| Age | 25 -35 years | 1 | 3.3 | 1 | 3.3 | $\chi 2=0.75$ p=0.86 |
| | 35 -45 years | 8 | 26.7 | 9 | 30.0 | |
| | 45 -55 years | 11 | 36.7 | 13 | 43.4 | |
| | > 55 years | 10 | 33.3 | 7 | 23.3 | |
| Gender | Male | 20 | 66.7 | 20 | 66.7 | $\chi 2=0.00$ p=1.00 |
| | Female | 10 | 33.3 | 10 | 33.3 | |
| Marital status | Married | 22 | 73.3 | 20 | 66.7 | $\chi 2=0.42$ p=0.93 |
| | Unmarried | 1 | 3.3 | 1 | 3.3 | |
| | Widow/Widower | 5 | 16.7 | 7 | 23.3 | |
| | Divorced | 2 | 6.7 | 2 | 6.7 | |
| Education status | No formal education | 4 | 13.3 | 7 | 23.3 | $\chi 2=3.48$ p=0.48 |
| | Primary school | 8 | 26.7 | 12 | 40.0 | |
| | Secondary school | 10 | 33.3 | 7 | 23.3% | |
| | PUC | 4 | 13.3 | 2 | 6.7 | |
| | Graduate | 4 | 13.3 | 2 | 6.7 | |
| Occupation | House wife | 7 | 23.3 | 7 | 23.3 | $\chi 2=0.57$ p=0.96 |
| | Labourer | 14 | 46.7 | 13 | 43.4 | |
| | Business | 5 | 16.7 | 7 | 23.3 | |
| | Government | 1 | 3.3 | 1 | 3.3 | |
| | Others | 3 | 10.0 | 2 | 6.7 | |
| Monthly income | Rs.2000 - 3000 | 3 | 10.0 | 3 | 10.0 | $\chi 2=0.53$ p=0.97 |
| | Rs.3000 - 4000 | 8 | 26.7 | 6 | 20.0 | |
| | Rs.4000 -5000 | 11 | 36.7 | 11 | 36.7 | |
| | Rs.5000- 10000 | 7 | 23.3 | 9 | 30.0 | |
| | > Rs.10000 | 1 | 3.3% | 1 | 3.3 | |
| Religion | Hindu | 24 | 80.0 | 19 | 63.3 | $\chi 2=2.06$ p=0.35 |
| | Muslim | 2 | 6.7 | 4 | 13.3 | |
| | Christian | 4 | 13.3 | 7 | 23.3 | |

*** Significant at p≤ 0.05, ** Significant at p≤ 0.01, *** Significant at p≤0.001**

Table 1 shows the distribution of Demographic variables of the study participants. It reveals about the demographic information of the participants those who are participated in this study. Among the participants majority of them (Experimental – 36.7%, Control -43.7%) are between 45-55yrs, about 33.3% in experimental and 26.7% in Control group subjects were between 35-45 yrs, and a very minimal (1%) of subjects was in the age group between 25-35yrs, and about 23.3%in experimental and 33.3% in control group were above 55 years of age.

According to the table it shows male predominance which may be due to the fact that men (66.7%) are more often affected with stroke than women 33.3% in both experimental and control group.

Educational qualification of both control and experimental group shows some difference. Most of the subjects in experimental group are educated up to primary level (40.0%) and in control group is up to secondary level (33.3%).very minimal percentage of subjects were graduates both in experimental(6.7%) and control (13.3%) group.

Majority of the study subjects were married in both groups (experimental -70.0% and control-73.3%).

Almost occupation of the study participants were laborers' in both groups (46.7%).

Based on the above table 1 it reveals that the monthly income of most of the study participants was between Rs4000-5000 (36.7%). very minimal percentage of the participants in both group have monthly income above Rs 10,000 (3.3%).

Higher percentage of Hindus participated in this study (experimental-80%, control-63.3%). About 13.3% were Muslims and 36.7% were Christians in experimental group and about 6.7 were Muslims and 13.3% were Christians in Control group.

**Table 2: Disease related Information Data**

| Clinical variable | | Experiment | | Control | | Chi square test |
|---|---|---|---|---|---|---|
| | | f | % | f | % | |
| History of any systemic illness | Yes | 24 | 80.0 | 24 | 80.0 | $\chi 2=0.10$ p=0.75 |
| | No | 6 | 20.0 | 6 | 20.0 | |
| If yes ,Specify | Hypertension | 11 | 45.8 | 10 | 41.7 | $\chi 2=1.17$ p=0.75 |
| | Cardiovascular Disease | 2 | 8.3 | 4 | 16.7 | |
| | Diabetes Mellitus | 9 | 37.5 | 9 | 37.5 | |
| | HT+DM | 2 | 8.3 | 1 | 4.2 | |
| Duration of illness | < 1 year | 3 | 13.0 | 6 | 22.2 | $\chi 2=1.81$ p=0.40 |
| | 1 - 5 years | 3 | 13.0 | 6 | 22.2 | |
| | > 5 years | 17 | 74.0 | 15 | 55.6 | |
| What do you mean by stroke | Paralysis | 15 | 50.0 | 17 | 56.7 | $\chi 2=0.45$ p=0.79 |
| | Muscle weakness | 8 | 26.7 | 8 | 26.6 | |
| | Disability | 7 | 23.3 | 5 | 16.7 | |
| Diet | Vegetarian | 2 | 6.7 | 6 | 20.0 | $\chi 2=3.25$ p=0.19 |
| | Non vegetarian | 4 | 13.3 | 6 | 20.0 | |
| | Mixed | 24 | 80.0 | 18 | 60.0 | |
| Causes of stroke | Hypertension | 11 | 36.7 | 14 | 46.6 | $\chi 2=2.33$ p=0.67 |
| | Hereditary | 7 | 23.3 | 4 | 13.3 | |
| | Smoker/Alcoholic | 5 | 16.7 | 5 | 16.7 | |
| | Cardio vascular Disease | 3 | 10.0 | 5 | 16.7 | |
| | Cerebro vascular Accident | 4 | 13.3 | 2 | 6.7 | |

*** Significant at p≤ 0.05 ,**
**** Significant at p≤ 0.01 ,**
***** Significant at p≤0.001**

Table 2 explains about the disease related information data of the study participants. In both Experimental and Control group (80.0%) majority of the subjects have Systemic illness. Among the participants in experimental group around 45.8% were Hypertensive, 8.3% were Cardiac clients, and 37.5% were Diabetic. In Control group around 41.7% were Hypertensive, 16.7% were Cardiac clients, and 37.5% were Diabetic.

About 74% in experimental and 55.6% Control group clients have the systemic illness more than five years. Very minimal percentage of the study participants had the systemic illness less than one year13.3% (Experimental).and (Control) 22.3%

Most of the study subjects have the knowledge about stroke in experimental it was about 56.6% and in control it was about 50.0%. 26.7% of subjects in both the group consider stroke as a muscle weakness, and about16.7% in experimental and 23.3% in control group feels that stroke means disability of a particular part or organ.

Most of the study participants were consumes mixed diet 46.7% (Experimental) and 80% (Control) group. The high percentage 46.7% in experimental and 36.7% in Control group were answered that causes of stroke is due to Hypertension. Among the study participants (16.7%) of subject's cause for stroke is smoking in both the group. Around 16.7% in experimental and 10.0% in Control group shows the causes of stroke is due to cardio vascular diseases.

**Section B: Pre assessment of motor function using BrunnStrom's stages of motor recovery tool and pre assessment of Modified Asworth Scale.**

**Table 3: Pretest Level Of Brun Strom's Stages Of Motor Recovery**

| Motor recovery | group | | | | Chi square test |
|---|---|---|---|---|---|
| | Experiment | | Control | | |
| | frequency | % | frequency | % | |
| Flaccidity no voluntary movements | 20 | 66.7 | 17 | 56.7 | $\chi 2=0.63$ p=0.42 |
| Hyperplexia emergence of spasticity and synergies | 10 | 33.3 | 13 | 43.3 | |
| Voluntary movements within synergy | 0 | 0.0 | 0 | 0.0 | |
| Isolated voluntary movements, spasticity and synergies decline | 0 | 0.0 | 0 | 0.0 | |
| Increasing voluntary control ,coordination | 0 | 0.0 | 0 | 0.0 | |
| Motor control and coordination | 0 | 0.0 | 0 | 0.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

* Significant at p≤ 0.05,

** Significant at p≤ 0.01,

*** Significant at p≤0.001

In pretest, experiment clients have, 66.7% of flaccidity no voluntary movement and 33.3% have hyperplexia emergence of spasticity and synergies. In control group clients, they have 56.7% of flaccidity no voluntary movement and 43.3% have hyperplexia emergence of spasticity and synergies. Statistically there is no significant difference between experiment and control group. It was confirmed using chi square test.

Assessment scales BrunnStrom's Stages Of Motor Recovery.

1. Grade 1.Flaccidity No voluntary movements
2. Grade 2.Hyperplexia emergence of spasticity and synergies
3. Grade 3.Voluntary movements within synergy
4. Grade 4.Isolated voluntary movements, spasticity and synergies decline
5. Grade 5.Increasing voluntary control, coordination
6. Grade 6. Motor control and coordination

**Table 4: Pretest Level Of Modified Ashworth Scale Of Muscle Spasticity**

| MAS of muscle spasticity scale | group | | | | Chi square test |
|---|---|---|---|---|---|
| | Experiment | | Control | | |
| | frequency | % | Frequency | % | |
| No increase in muscle tone | 15 | 50.0 | 13 | 43.3 | |
| Slight increase in muscle tone | 15 | 50.0 | 17 | 56.7 | |
| Slight increase in muscle tone manifested by catch minimal | 0 | 0.0 | 0 | 0.0 | $\chi 2=0.26$ p=0.60 |
| More marked in muscle tone through most of ROM | 0 | 0.0 | 0 | 0.0 | |
| Considerable increase in muscle tone ,passive difficult | 0 | 0.0 | 0 | 0.0 | |
| Affected part(s) rigid in flexion and extension | 0 | 0.0 | 0 | 0.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

**The above table shows the pretest level of MAS score,**

Assessment Scale. Modified Ashworth Scale of Muscle Spasticity

1. Grade 0 –No increase in muscle tone
2 Grade 1 –Slight increase in muscle tone
3. Grade 2 –Slight increase in muscle tone manifested by catch minimal
4. Grade 3 – More marked in muscle tone through most of ROM
5. Grade 4 –Considerable increase in muscle tone, passive difficult
6. Grade 5 – Affected part(s) rigid in flexion and extension.

**Section :C Post test Level of BrunnStrom's Of Motor Recovery and Posttest Level of Modified Ashworth Scale of Muscle Spasticity Score**

**Table 5: Posttest Level Of BrunnStrom's Stages Of Motor Recovery**

| Motor recovery | group | | | | Chi square test |
|---|---|---|---|---|---|
| | Experiment | | Control | | |
| | f | % | f | % | |
| Flaccidity no voluntary movements | 0 | 0.0 | 13 | 43.3 | **$\chi$2=42.1 p=0.001**** |
| Hyperplexia emergence of spasticity and synergies | 0 | 0.0 | 8 | 26.7 | |
| Voluntary movements within synergy | 9 | 30.0 | 9 | 30.0 | |
| Isolated voluntary movements, spasticity and synergies decline | 16 | 53.3 | 0 | 0.0 | |
| Increasing voluntary control ,coordination | 5 | 16.7 | 0 | 0.0 | |
| Motor control and coordination | 0 | 0.0 | 0 | 0.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

*** Significant at p≤ 0.05, ** Significant at p≤ 0.01,*** Significant at p≤0.001**

In post test, experiment clients had, 30.0% of **Voluntary movements within synergy,** 53.3% had **isolated voluntary movements; spasticity and synergies decline** and 16.7 had **Increasing voluntary control, coordination**. In control group, 43.3% of them had **Flaccidity no voluntary movements**, 26.7% **Hyperplexia emergence of spasticity and synergies** and 30% **Voluntary movements within synergy.** Statistically there is a significant difference between experiment and control group. It was confirmed using chi square test.

**Table 6: posttest level of modified ashworth scale of muscle spasticity**

| Muscle spasticity | Group | | | | Chi square test |
|---|---|---|---|---|---|
| | Experiment | | Control | | |
| | f | % | f | % | |
| No increase in muscle tone | 0 | 0.0 | 6 | 20.0 | **$\chi 2=46.67$ p=0.001*** ** |
| Slight increase in muscle tone | 0 | 0.0 | 19 | 63.3 | |
| Slight increase in muscle tone manifested by catch minimal | 10 | 33.3 | 5 | 16.7 | |
| More marked in muscle tone through most of ROM | 10 | 33.3 | 0 | 0.0 | |
| Considerable increase in muscle tone ,passive difficult | 7 | 23.4 | 0 | 0.0 | |
| Affected part(s) rigid in flexion and extension | 3 | 10.0 | 0 | 0.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

*** Significant at p≤ 0.05,**

**** Significant at p≤ 0.01,**

***** Significant at p≤0.001**

The above table shows the post test values of Modified Asworth scale of spascity, it shows there is a significant difference between the pre and post assessment of experimental and control group. $\chi 2=46.67$ p=0.001*** this analysis was made using chi square test and it is statistically significant

**Section :D Table 7: Comparison Of Pretest And Posttest Level Of Brun Strom's Stages Of Motor Recovery(Experiment)**

| Motor recovery score | Test | | | | Chi square test |
|---|---|---|---|---|---|
| | Pre-test | | Post-test | | |
| | f | % | f | % | |
| Flaccidity no voluntary movements | 20 | 66.7 | 0 | 0.0 | **$\chi 2$=60.0 p=0.001*** ** |
| Hyperplexia emergence of spasticity and synergies | 10 | 33.3 | 0 | 0.0 | |
| Voluntary movements within synergy | 0 | 0.0 | 9 | 30.0 | |
| Isolated voluntary movements, spasticitys and synergies decline | 0 | 0.0 | 16 | 53.3 | |
| Increasing voluntary control ,coordination | 0 | 0.0 | 5 | 16.7 | |
| Motor control and coordination | 0 | 0.0 | 0 | 0.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

In pretest, experiment clients had 66.7% of flacidity no voluntary movement and 33.3% had Hyperplexia emergence of spasticity and synergies. In posttest, they had 30.0% of Voluntary movements within synergy, 53.3% had Isolated voluntary movements, spasticity and synergies decline and 16.7% had Increasing voluntary control ,coordination. Statistically there is a significant difference between pretest and posttest. It was confirmed using chi square test.

**Section :D comparison of experimental and control group with Brunnstrom's stages motor recovery score and comparison of modified Ashworth scale of muscle spasticity**

**Table 8: Comparison Of Pretest And Posttest Level Of Brun Strom's Stages Of Motor Recovery(control)**

| Motor recovery | Test | | | | Chi square test |
|---|---|---|---|---|---|
| | Pre-test | | Post-test | | |
| | f | % | f | % | |
| Flaccidity no voluntary movements | 17 | 56.7 | 13 | 43.3 | **$\chi 2=10.7$ p=0.001*** ** |
| Hyperplexia emergence of spasticity and synergies | 13 | 43.3 | 8 | 26.7 | |
| Voluntary movements within synergy | 0 | 0.0 | 9 | 30.0 | |
| Isolated voluntary movements, spasticity and synergies decline | 0 | 0.0 | 0 | 0.0 | |
| Increasing voluntary control ,coordination | 0 | 0.0 | 0 | 0.0 | |
| Motor control and coordination | 0 | 0.0 | 0 | 0.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

In pretest, control clients had, 56.7% of flaccidity no voluntary movement and 43.3% had Hyperplexia emergence of spasticity and synergies. In posttest, they had 43.3% of flaccidity no voluntary movement, and 26.7% had Hyperplexia emergence of spasticity and 30% of them had Voluntary movements within synergy. Statistically there is a significant difference between pretest and posttest. It was confirmed using chi square test.

**Table 9: Comparison Of Pretest And Posttest Level Of Modified Ashworth Scale Of Muscle Spasticity (Experiment)**

| Modified Asworth scale(Experimental) For motor recovery | Pretest | | Posttest | | Chi square test |
|---|---|---|---|---|---|
| | f | % | f | % | |
| No increase in muscle tone | 15 | 50.0 | 0 | 0.0 | |
| Slight increase in muscle tone | 15 | 50.0 | 0 | 0.0 | **$\chi$2=36.0 p=0.001*** ** |
| Slight increase in muscle tone manifested by catch minimal | 0 | 0.0 | 10 | 33.3 | |
| More marked in muscle tone through most of ROM | 0 | 0.0 | 10 | 33.3 | |
| Considerable increase in muscle tone, passive difficult | 0 | 0.0 | 7 | 23.4 | |
| Affected part(s) rigid in flexion and extension | 0 | 0.0 | 3 | 10.0 | |
| TOTAL | 30 | 100.0 | 30 | 100.0 | |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

**Table 10: Comparison Of Pretest And Posttest Level Of Modified Ashworth Scale Of Muscle Spasticity(Control)**

| Modified Ashwoeth scale (control) | Pretest | | Posttest | | Chi square test |
|---|---|---|---|---|---|
| | f | % | f | % | |
| No increase in muscle tone | 13 | 43.3 | 6 | 20.0 | **$\chi$2=7.69 p=0.05*** |
| Slight increase in muscle tone | 17 | 56.7 | 19 | 63.3 | |
| Slight increase in muscle tone manifested by catch minimal | 0 | 0.0 | 5 | 16.7 | |
| More marked in muscle tone throughmost of ROM | 0 | 0.0 | 0 | 0.0 | |
| Considerable increase in muscle tone ,passive difficult | 0 | 0.0 | 0 | 0.0 | |
| Affected part(s) rigid in flexion and extension | 0 | 0.0 | 0 | 0.0 | |
| **TOTAL** | 30 | 100.0 | 30 | 100.0% | |

*** Significant at p≤ 0.05,** Significant at p≤ 0.01,*** Significant at p≤0.001**

The above table 10 and 11 shows the comparison of pre and post test among control group. There is also a significant relationship between pre and post test scores.

**Table 11: Comparison Of Experiment And Control Group Mean Score**

| Muscle tone | | group | N | Mean | SD | Mean difference | Student independent t-test |
|---|---|---|---|---|---|---|---|
| **Brun Strom's Stages Of Motor Recovery** | Pre-Test | Experiment | 30 | 1.33 | .47 | 0.10 | t=0.78 p=0.43 |
| | | Control | 30 | 1.43 | .50 | | |
| | Post-Test | Experiment | 30 | 3.87 | .68 | **2.00** | **t=9.97 p=0.001*** ** |
| | | Control | 30 | 1.87 | .86 | | |
| **Modified Ashworth Scale Of Muscle Spasticity** | Pre-Test | Experiment | 30 | 1.50 | .50 | 0.07 | t=0.51 p=0.62 |
| | | Control | 30 | 1.57 | .50 | | |
| | Post-Test | Experiment | 30 | 4.10 | .99 | **2.13** | **t=9.99 p=0.001*** ** |
| | | Control | 30 | 1.97 | .61 | | |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

Both Brunnstorm's scale and Modified Asworth spasticity scale had significant differences between pre and post test. In pretest there is no statistically significant difference between experiment and control group. In posttest there is a statistically significant difference between experiment and control group. It was confirmed using student independent t-test. **Burnnstrom's stages for motor recovery t=9.97 p=0.001***, Modified Asworth Scale t=9.99 p=0.001*****

**Table 11.1: Comparison Of Pretest And Posttest Mean Score**

| Assessment tool | | Group | N | Mean | SD | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|---|
| Brunn Strom's Stages Of Motor Recovery | Experiment | Pretest | 30 | 1.33 | .47 | 2.53 | **t=19.99** |
| | | Posttest | 30 | 3.87 | .68 | | **p=0.001*** ** |
| | Control | Pretest | 30 | 1.43 | .50 | 0.43 | **t=2.13** |
| | | Posttest | 30 | 1.87 | .86 | | **p=0.05*** |
| Modified Ashworth Scale Of Muscle Spasticity | Experiment | Pretest | 30 | 1.50 | .50 | 2.60 | **t=14.70p=0.** |
| | | Posttest | 30 | 4.10 | .99 | | **001*** ** |
| | Control | Pretest | 30 | 1.57 | .50 | 0.40 | **t=2.09** |
| | | Posttest | 30 | 1.97 | .61 | | **p=0.05*** |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

There is a statistically significant difference in upper motor functions of clients with stroke (p≤ 0.001)

## Section: E Effectiveness Of Mirror Therapy

**Table 12: Effectiveness Of Mirror Therapy On Upper Limb Motor Functions Among Clients With Stroke**

| Scale | Group | | Maximum score | Mean | Mean Difference with 95% confidence interval | Percentage of Mean Difference with 95% confidence interval |
|---|---|---|---|---|---|---|
| BRUN STROM'S STAGES OF MOTOR RECOVERY | Experiment | Pre-test | 6 | 1.33 | 2.53(2.26 - 2.86) | **42.2%(37.6%-47.7%)** |
| | | Post-test | 6 | 3.87 | | |
| | Control | Pre-test | 6 | 1.43 | 0.43(0.10-0.77) | **7.2%(1.7%-12.8%)** |
| | | Post-test | 6 | 1.87 | | |
| MODIFIED ASHWORTH SCALE OF MUSCLE SPASTICITY | Experiment | Pre-test | 5 | 1.50 | 2.60(2.24-2.96) | **52.0%(44.8%-59.2%)** |
| | | Post-test | 5 | 4.10 | | |
| | Control | Pre-test | 5 | 1.57 | 0.40(0.11-0.69) | **8.0%(2.2%-13.8%)** |
| | | Post-test | 5 | 1.97 | | |

*** Significant at p≤ 0.05,**
**** Significant at p≤ 0.01,**
***** Significant at p≤0.001**

- BRUN STROM'S STAGES OF MOTOR RECOVERY score, experiment group benefitted 42.2% where as control group with routine treatment benefitted only 7.2%.
- MODIFIED ASHWORTH SCALE OF MUSCLE SPASTICITY score, experiment group benefitted 52.2% where as control group with routine treatment benefitted only 8.8%. This difference shows the effectiveness of Mirror therapy on upper limb motor functions among clients with stroke admitted in RG GGH ,Chennai.

**Section: F Association between level of improvement in hand functions and selected demographic variables.**

**Table 13: Association between level Brunnstrom's stages of motor recovery gain score and clients demographic variables(experiment)**

| Demographic variables | | Level of Brunnstrom's stages of motor recovery gain score | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Below average(≤2.53) | | Above average(>2.53) | | | |
| | | f | % | f | % | | |
| Age | 25 -35 years | 0 | 0.0 | 1 | 100.0 | 1 | **χ2=7.91 p=0.05*** |
| | 35 -45 years | 1 | 12.5 | 7 | 87.5 | 8 | |
| | 45 -55 years | 7 | 63.6 | 4 | 36.4 | 11 | |
| | > 55 years | 7 | 70.0 | 3 | 30.0 | 10 | |
| Gender | Male | 10 | 50.0 | 10 | 50.0 | 20 | χ2=0.0 p=1.00 |
| | Female | 5 | 50.0 | 5 | 50.0 | 10 | |
| Marital status | Married | 11 | 50.0 | 11 | 50.0 | 22 | χ2=1.20 p=0.75 |
| | Unmarried | | | 1 | 100.0 | 1 | |
| | Widow/Widower | 3 | 60.0 | 2 | 40.0 | 5 | |
| | Divorced | 1 | 50.0 | 1 | 50.0 | 2 | |
| Education status | Illiterate | 3 | 75.0 | 1 | 25.0 | 4 | **χ2=11.40 p=0.05*** |
| | Primary school | 6 | 75.0 | 2 | 25.0 | 8 | |
| | Secondary school | 6 | 60.0 | 4 | 40.0 | 10 | |
| | PUC | 0 | 0.0 | 4 | 100.0 | 4 | |
| | Graduate | 0 | 0.0 | 4 | 100.0 | 4 | |
| Occupation | House wife | 3 | 42.9 | 4 | 57.1 | 7 | χ2=3.56 p=0.47 |
| | Labourer | 8 | 57.1 | 6 | 42.9 | 14 | |
| | Business | 1 | 20.0 | 4 | 80.0 | 5 | |
| | Government | 1 | 100.0 | 0 | 0 | 1 | |
| | Others | 2 | 66.7 | 1 | 33.3 | 3 | |
| Monthly income | Rs.2000 – 3000 | 1 | 33.3 | 2 | 66.7 | 3 | χ2=5.74 p=0.21 |
| | Rs.3000 – 4000 | 2 | 25.0 | 6 | 75.0 | 8 | |
| | Rs.4000 -5000 | 8 | 72.7 | 3 | 27.3 | 11 | |
| | Rs.5000- 10000 | 3 | 42.9 | 4 | 57.1 | 7 | |
| | > Rs.10000 | 1 | 100.0 | 0 | 0 | 1 | |
| Religion | Hindu | 11 | 45.8 | 13 | 54.2 | 24 | χ2=1.16 p=0.57 |
| | Muslim | 1 | 50.0 | 1 | 50.0 | 2 | |
| | Christian | 3 | 75.0 | 1 | 25.0 | 4 | |
| H/Osystemic illness | Yes | 15 | 62.5 | 9 | 37.5 | 24 | **χ2=7.50 p=0.01**** |
| | No | 0 | 0 | 6 | 100.0 | 6 | |
| If yes ,Specify | Hypertension | 5 | 45.5 | 6 | 54.5 | 11 | χ2=4.30 p=0.23 |
| | Cardiovascular Disease | 1 | 50.0 | 1 | 50.0 | 2 | |
| | Diabetes Mellitus | 8 | 88.9 | 1 | 11.1 | 9 | |
| | HT+DM | 1 | 50.0 | 1 | 50.0 | 2 | |
| Duration of illness | < 1 year | 1 | 33.3 | 2 | 66.7 | 3 | χ2=2.94 p=0.22 |
| | 1 - 5 years | 3 | 100.0 | 0 | 0 | 3 | |
| | > 5 years | 11 | 64.7 | 6 | 35.3 | 17 | |
| What do you mean by stroke | Paralysis | 6 | 40.0 | 9 | 60.0 | 15 | χ2=1.88 p=0.39 |
| | Muscle weakness | 4 | 50.0 | 4 | 50.0 | 8 | |
| | Disability | 5 | 71.4 | 2 | 28.6 | 7 | |
| Diet | Vegetarian | 1 | 50.0 | 1 | 50.0 | 2 | χ2=1.16 p=0.55 |
| | Non vegetarian | 1 | 25.0 | 3 | 75.0 | 4 | |
| | Mixed | 13 | 54.2 | 11 | 45.8 | 24 | |
| Causes of stroke | Hypertension | 5 | 45.5 | 6 | 54.5 | 11 | χ2=0.76 p=0.94 |
| | Hereditary | 4 | 57.1 | 3 | 42.9 | 7 | |
| | Smoker/Alcoholic | 2 | 40.0 | 3 | 60.0 | 5 | |
| | CVD | 2 | 66.7 | 1 | 33.3 | 3 | |
| | CVA | 2 | 50.0 | 2 | 50.0 | 4 | |

*** Significant at p≤ 0.05,** Significant at p≤ 0.01,*** Significant at p≤0.001**

Table 13 shows the association of between the brunnstrom's stages of motor recovery level of gain score with selected demographic variable. Younger and educated clients with hypertension/diabetes mellitus was more than others. Statistical significance was calculated with using chi square test.

**Table 14: Association between level modified Asworth scale of muscle spasticity gain score and clients demographic variables (experiment)**

| Demographic variables | | Level of modified Asworth scale of muscle spasticity gain score | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Below average(≤2.60) | | Below average(>2.60) | | | |
| | | f | % | f | % | | |
| Age | 25 -35 years | 0 | 0.0 | 1 | 100.0 | 1 | **χ2=9.19 p=0.02*** |
| | 35 -45 years | 1 | 12.5 | 7 | 87.5 | 8 | |
| | 45 -55 years | 6 | 54.5 | 5 | 45.5 | 11 | |
| | > 55 years | 8 | 80.0 | 2 | 20.0 | 10 | |
| Gender | Male | 12 | 60.0 | 8 | 40.0 | 20 | χ2=2.40 p=0.12 |
| | Female | 3 | 30.0 | 7 | 70.0 | 10 | |
| Marital status | Married | 10 | 45.5 | 12 | 54.5 | 22 | χ2=2.98 p=0.39 |
| | Unmarried | | | 1 | 100.0 | 1 | |
| | Widow/Widower | 4 | 80.0 | 1 | 20.0 | 5 | |
| | Divorced | 1 | 50.0 | 1 | 50.0 | 2 | |
| Education status | Illiterate | 4 | 100.0 | 0 | 0.0 | 4 | **χ2=9.50 p=0.05*** |
| | Primary school | 5 | 62.5 | 3 | 37.5 | 8 | |
| | Secondary school | 5 | 50.0 | 5 | 50.0 | 10 | |
| | PUC | 1 | 25.0 | 3 | 75.0 | 4 | |
| | Graduate | 0 | 0.0 | 4 | 100.0 | 4 | |
| Occupation | House wife | 3 | 42.9 | 4 | 57.1 | 7 | χ2=1.67 p=0.79 |
| | Labourer | 7 | 50.0 | 7 | 50.0 | 14 | |
| | Business | 3 | 60.0 | 2 | 40.0 | 5 | |
| | Government | 1 | 100.0 | | | 1 | |
| | Others | 1 | 33.3 | 2 | 66.7 | 3 | |
| Monthly income | Rs.2000 - 3000 | 2 | 66.7 | 1 | 33.3 | 3 | χ2=2.06 p=0.72 |
| | Rs.3000 - 4000 | 3 | 37.5 | 5 | 62.5 | 8 | |
| | Rs.4000 -5000 | 5 | 45.5 | 6 | 54.5 | 11 | |
| | Rs.5000- 10000 | 4 | 57.1 | 3 | 42.9 | 7 | |
| | > Rs.10000 | 1 | 100.0 | | | 1 | |
| Religion | Hindu | 11 | 45.8 | 13 | 54.2 | 24 | χ2=1.16 p=0.57 |
| | Muslim | 1 | 50.0 | 1 | 50.0 | 2 | |
| | Christian | 3 | 75.0 | 1 | 25.0 | 4 | |
| History of any systemic illness | Yes | 15 | 62.5 | 9 | 37.5 | 24 | **χ2=7.50 p=0.01**** |
| | No | 0 | 0.0 | 6 | 100.0 | 6 | |
| If yes ,Specify | Hypertension | 7 | 63.6 | 4 | 36.4 | 11 | χ2=4.79 p=0.18 |
| | Cardiovascular Disease | | | 2 | 100.0 | 2 | |
| | Diabetes Mellitus | 4 | 44.4 | 5 | 55.6 | 9 | |
| | HT+DM | 2 | 100.0 | | | 2 | |
| Duration of illness | < 1 year | 2 | 66.7 | 1 | 33.3 | 3 | χ2=0.81 p=0.66 |
| | 1 - 5 years | 1 | 33.3 | 2 | 66.7 | 3 | |
| | > 5 years | 10 | 58.8 | 7 | 41.2 | 17 | |
| What do you mean by stroke | Paralysis | 9 | 60.0 | 6 | 40.0 | 15 | χ2=1.24 p=0.53 |
| | Muscle weakness | 3 | 37.5 | 5 | 62.5 | 8 | |
| | Disability | 3 | 42.9 | 4 | 57.1 | 7 | |
| Diet | Vegetarian | | | 2 | 100.0 | 2 | χ2=3.00 p=0.22 |
| | Non vegetarian | 3 | 75.0 | 1 | 25.0 | 4 | |
| | Mixed | 12 | 50.0 | 12 | 50.0 | 24 | |
| Causes of stroke | Hypertension | 8 | 72.7 | 3 | 27.3 | 11 | χ2=4.09 p=0.39 |
| | Hereditary | 2 | 28.6 | 5 | 71.4 | 7 | |
| | Smoker/Alcoholic | 2 | 40.0 | 3 | 60.0 | 5 | |
| | CVD | 1 | 33.3 | 2 | 66.7 | 3 | |
| | CVA | 2 | 50.0 | 2 | 50.0 | 4 | |

*** Significant at p≤ 0.05, **significant at p≤ 0.01 ,*** Significant at p≤0.001**

Table 14 shows the association between the level of motor recovery gain score with selected demographic variable. Younger, (**χ2=9.19p=0.02) ,** more educated (**χ2=9.50 p=0.05***) and no other systemic disease clients (**χ2=7.50 p=0.01****) are benefitted more than others. Statistical significance was calculated using chi square test.

**Table 15: Association between level modified Asworth scale of muscle spasticity gain score and clients demographic variables(control)**

| Demographic variables | | Level of modified Asworth scale of muscle spasticity gain score | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Below average(≤0.40) | | Below average(>0.40) | | | |
| | | frequency | % | frequency | % | | |
| Age | 25 -35 years | 1 | 100.0 | | | 1 | $\chi2$=5.14 p=0.16 |
| | 35 -45 years | 2 | 22.2 | 7 | 77.8 | 9 | |
| | 45 -55 years | 7 | 53.8 | 6 | 46.2 | 13 | |
| | > 55 years | 5 | 71.4 | 2 | 28.6 | 7 | |
| Gender | Male | 12 | 60.0 | 8 | 40.0 | 20 | $\chi2$=2.40 p=0.12 |
| | Female | 3 | 30.0 | 7 | 70.0 | 10 | |
| Marital status | Married | 11 | 55.0 | 9 | 45.0 | 20 | $\chi2$=1.34 p=0.71 |
| | Unmarried | | | 1 | 100.0 | 1 | |
| | Widow/Widower | 3 | 42.9 | 4 | 57.1 | 7 | |
| | Divorced | 1 | 50.0 | 1 | 50.0 | 2 | |
| Education status | Illiterate | 4 | 57.1 | 3 | 42.9 | 7 | $\chi2$=0.28 p=0.99 |
| | Primary school | 6 | 50.0 | 6 | 50.0 | 12 | |
| | Secondary school | 3 | 42.9 | 4 | 57.1 | 7 | |
| | PUC | 1 | 50.0 | 1 | 50.0 | 2 | |
| | Graduate | 1 | 50.0 | 1 | 50.0 | 2 | |
| Occupation | House wife | 3 | 42.9 | 4 | 57.1 | 7 | $\chi2$=3.97 p=0.40 |
| | Labourer | 5 | 38.5 | 8 | 61.5 | 13 | |
| | Business | 4 | 57.1 | 3 | 42.9 | 7 | |
| | Government | 1 | 100.0 | | | 1 | |
| | Others | 2 | 100.0 | | | 2 | |
| Monthly income | Rs.2000 – 3000 | 3 | 100.0 | | | 3 | $\chi2$=4.86 p=0.30 |
| | Rs.3000 – 4000 | 2 | 33.3 | 4 | 66.7 | 6 | |
| | Rs.4000 -5000 | 5 | 45.5 | 6 | 54.5 | 11 | |
| | Rs.5000- 10000 | 5 | 55.6 | 4 | 44.4 | 9 | |
| | > Rs.10000 | | | 1 | 100.0 | 1 | |
| Religion | Hindu | 10 | 52.6 | 9 | 47.4 | 19 | $\chi2$=2.33 p=0.31 |
| | Muslim | 3 | 75.0 | 1 | 25.0 | 4 | |
| | Christian | 2 | 28.6 | 5 | 71.4 | 7 | |
| History of any systemic illness | Yes | 11 | 47.8 | 12 | 52.2 | 23 | $\chi2$=0.18 p=0.66 |
| | No | 4 | 57.1 | 3 | 42.9 | 7 | |
| If yes ,Specify | Hypertension | 3 | 33.3 | 6 | 66.7 | 9 | $\chi2$=3.96 p=0.26 |
| | Cardiovascular Disease | 1 | 25.0 | 3 | 75.0 | 4 | |
| | Diabetes Mellitus | 6 | 66.7 | 3 | 33.3 | 9 | |
| | HT+DM | 1 | 100.0 | | | 1 | |
| Causes of stroke | Hypertension | 9 | 64.3 | 5 | 35.7 | 14 | $\chi2$=754 p=0.11 |
| | Hereditary | | | 4 | 100.0 | 4 | |
| | Smoker/Alcoholic | 2 | 40.0 | 3 | 60.0 | 5 | |
| | CVD | 2 | 40.0 | 3 | 60.0 | 5 | |
| | CVA | 2 | 100.0 | | | 2 | |

*** Significant at p≤ 0.05, ** significant at p≤ 0.01 ,*** Significant at p≤0.001**

Table 15 shows the association of muscle spasticity gain score with selected demographic variable in control group. None of the variables are significant. Statistical significance was calculated using chi square test

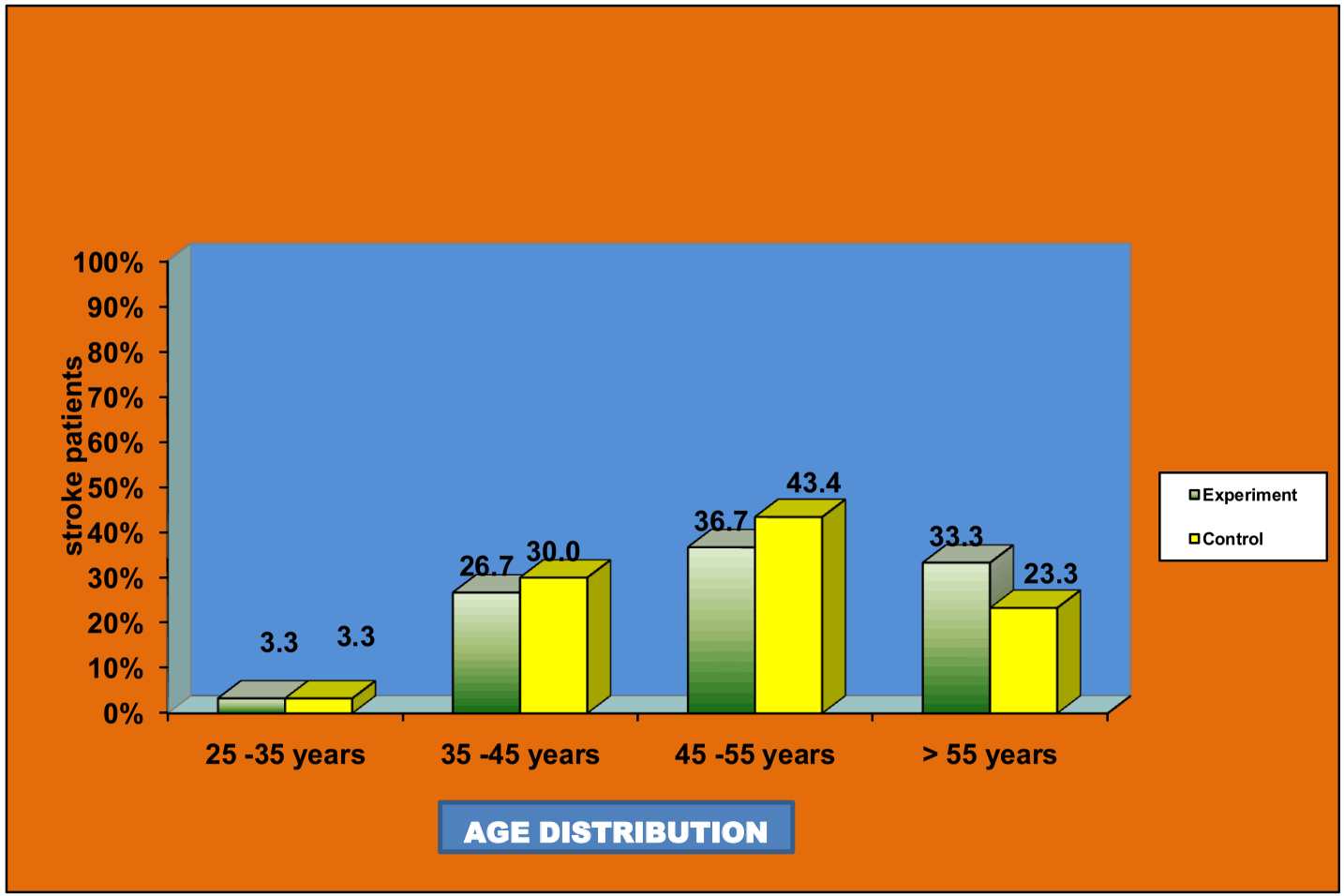


**Figure 4.1 age wise distribution of study participants**

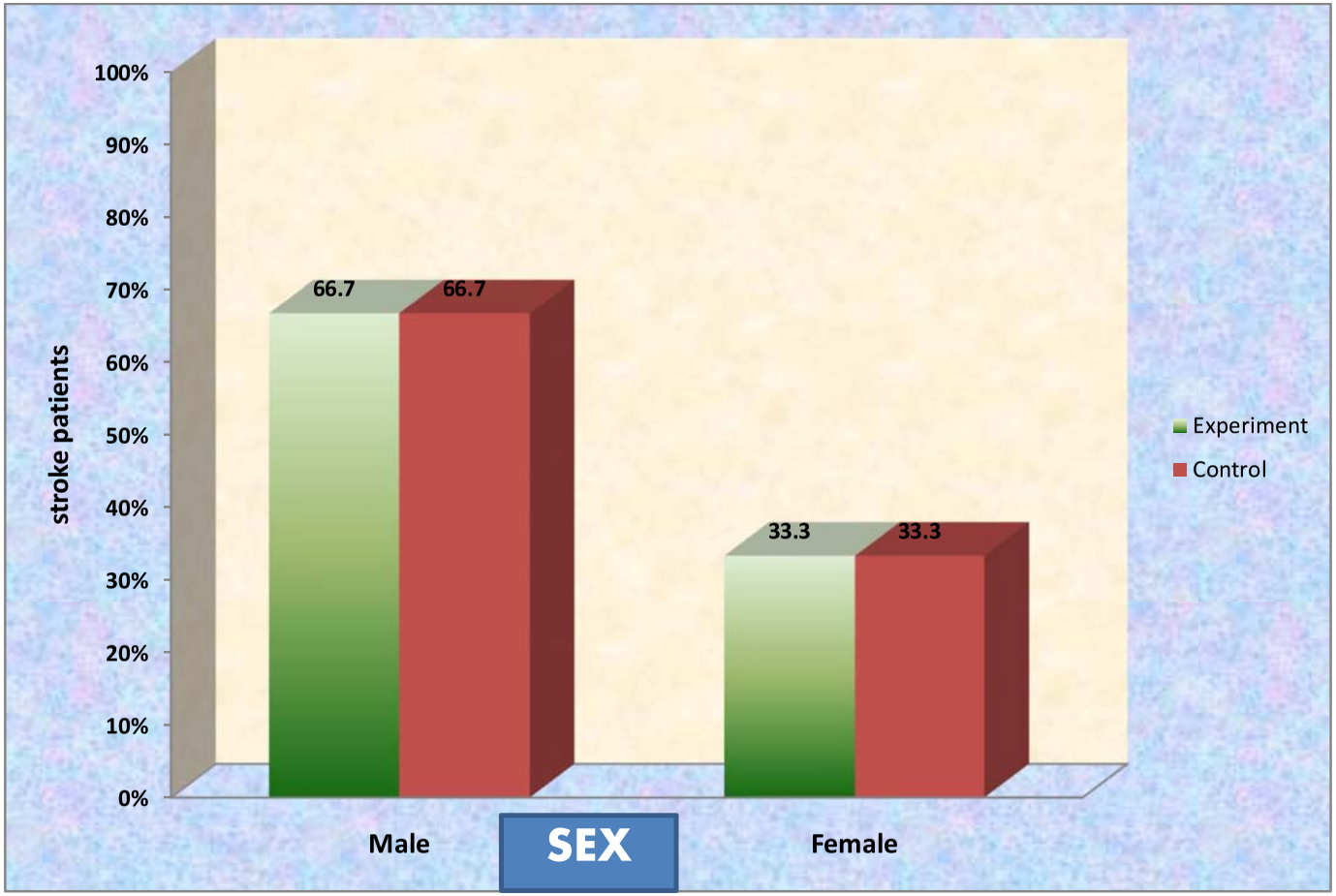


**Figure 4.2 Gender wise distributions of study participants**

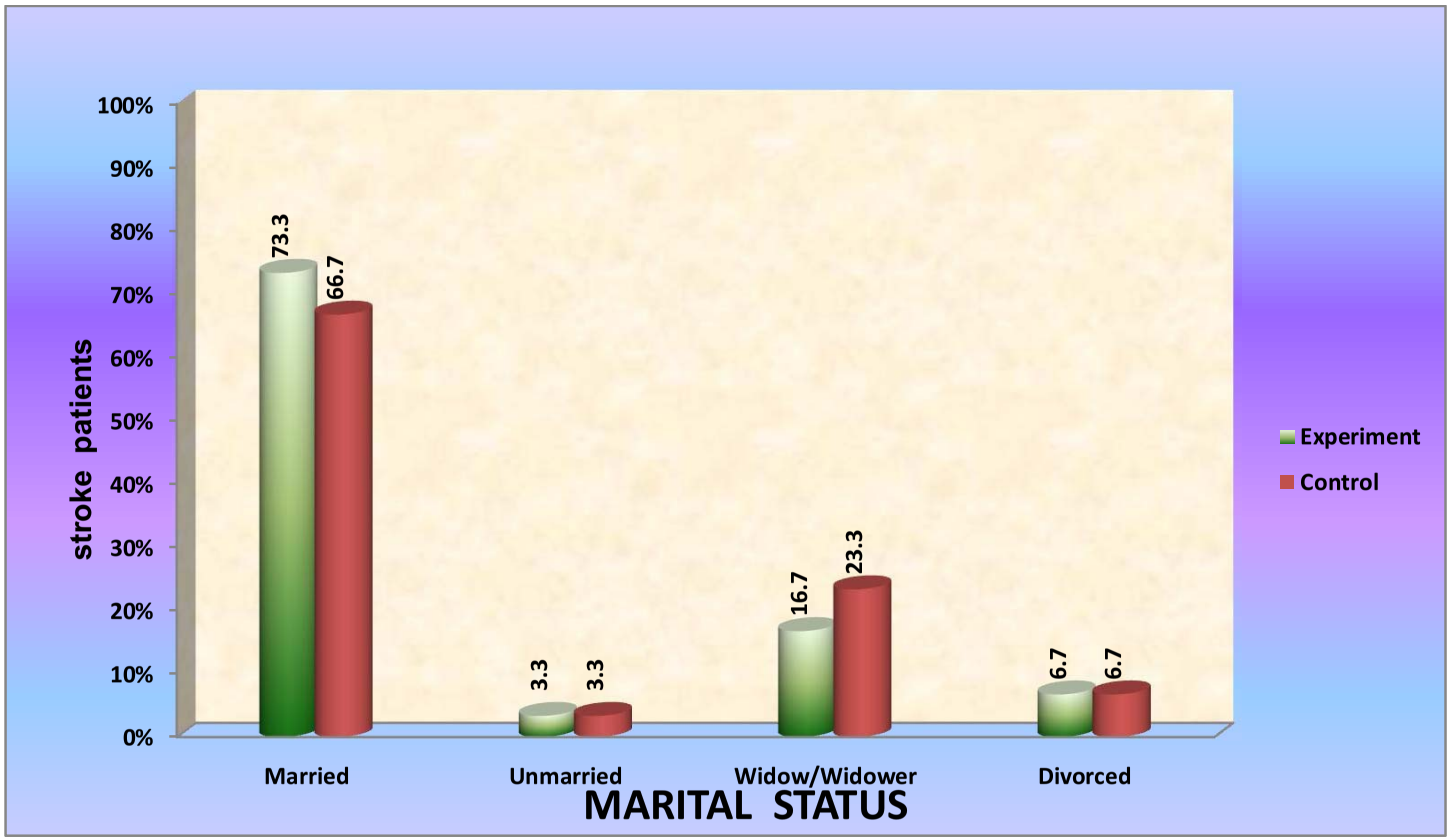


**Figure 4.3 distribution of marital status of the study participants**

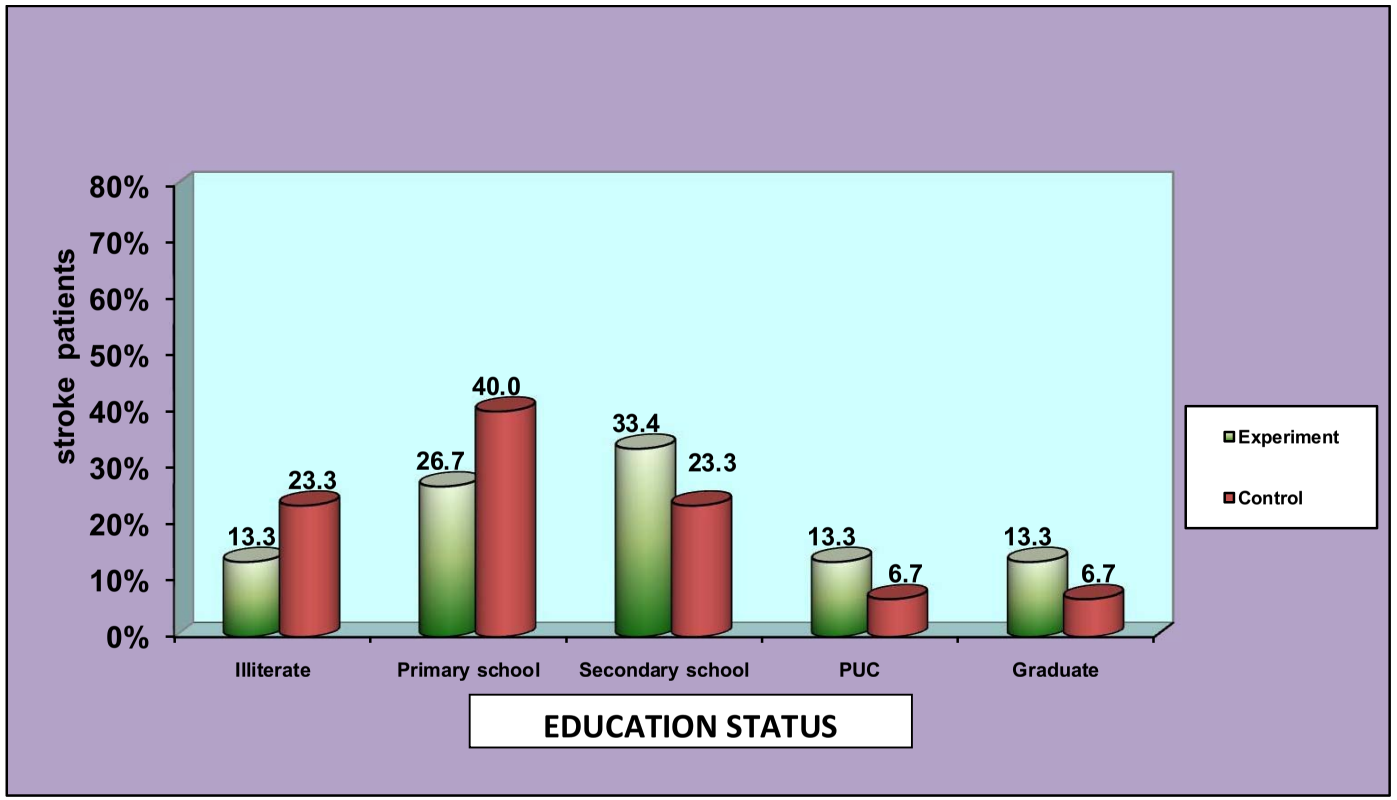


**Figure 4.4 distribution of educational status of the study participants**

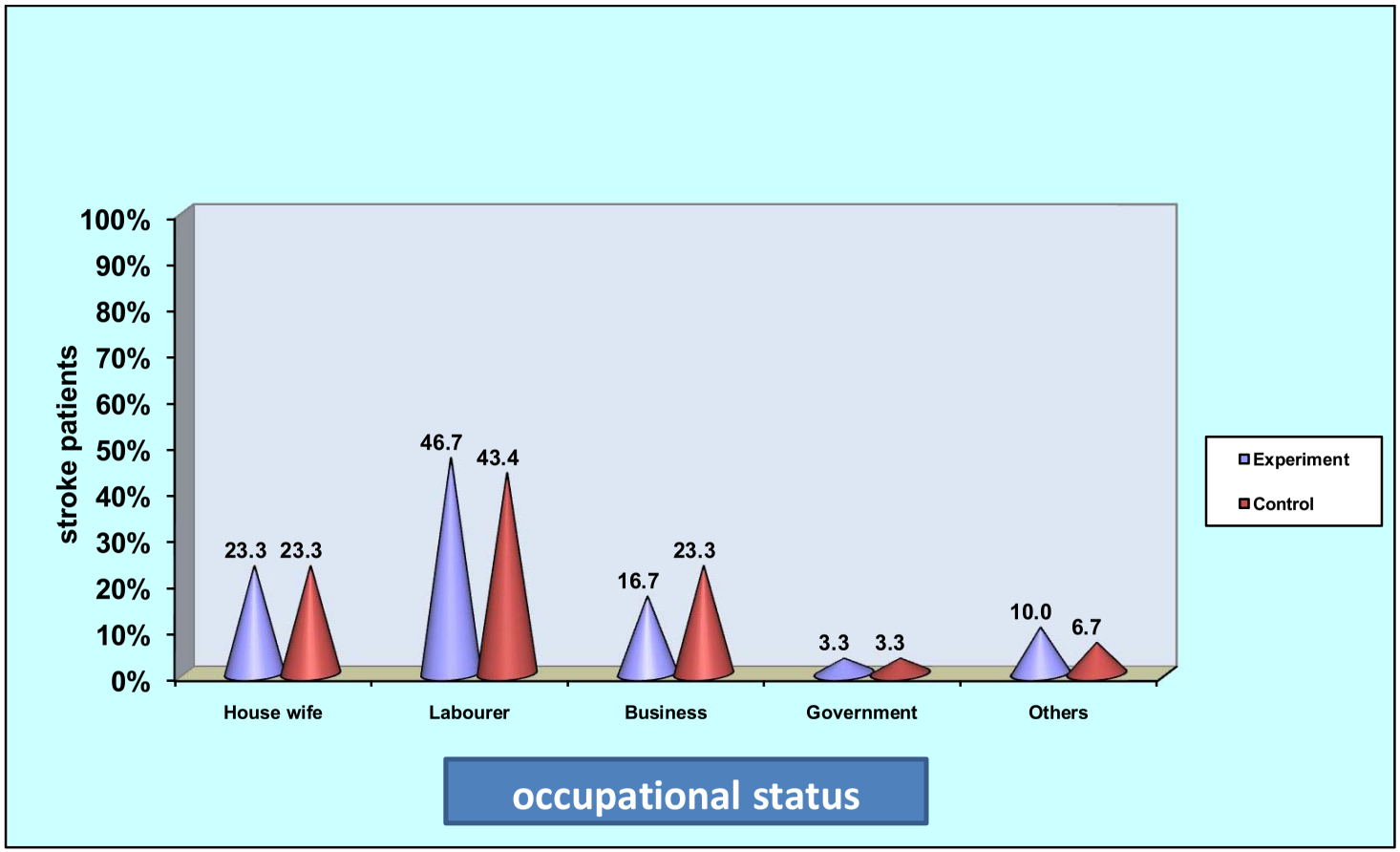


**Figure 4.5 distribution of occupational status of the study participants**

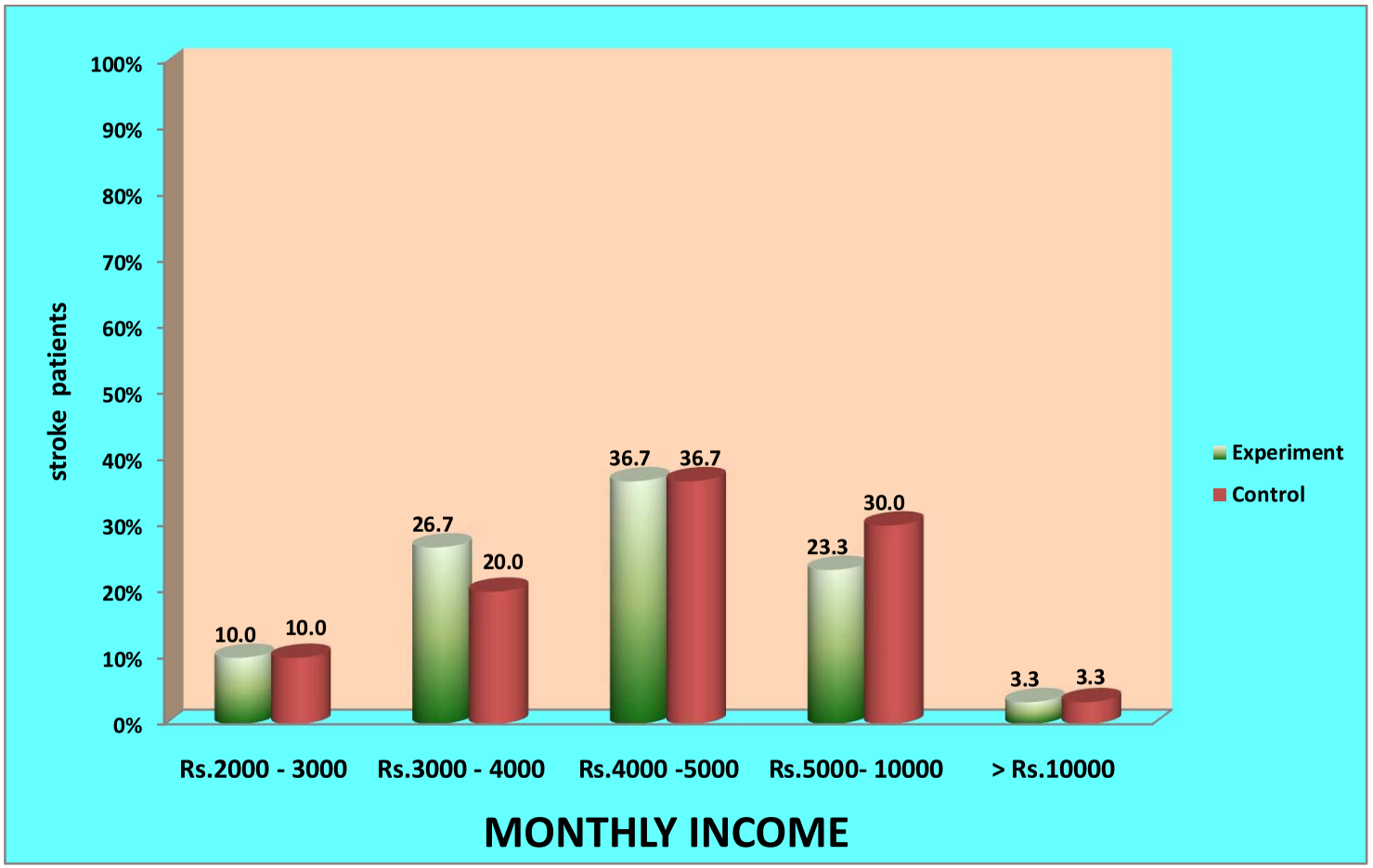


**Figure 4.6 distribution of monthly income status of the study participants**

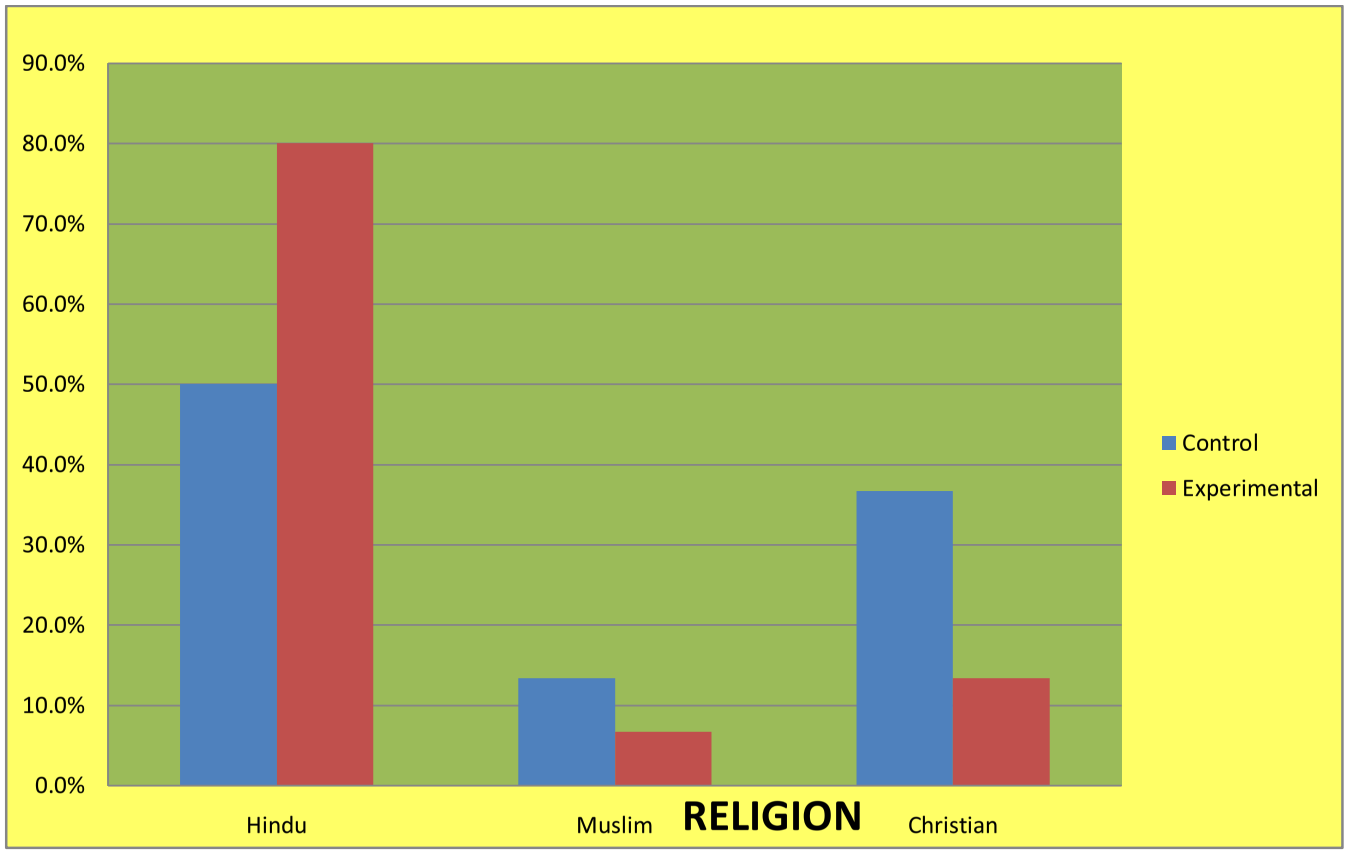


**Figure4.7 distribution of religious status of the study participants**

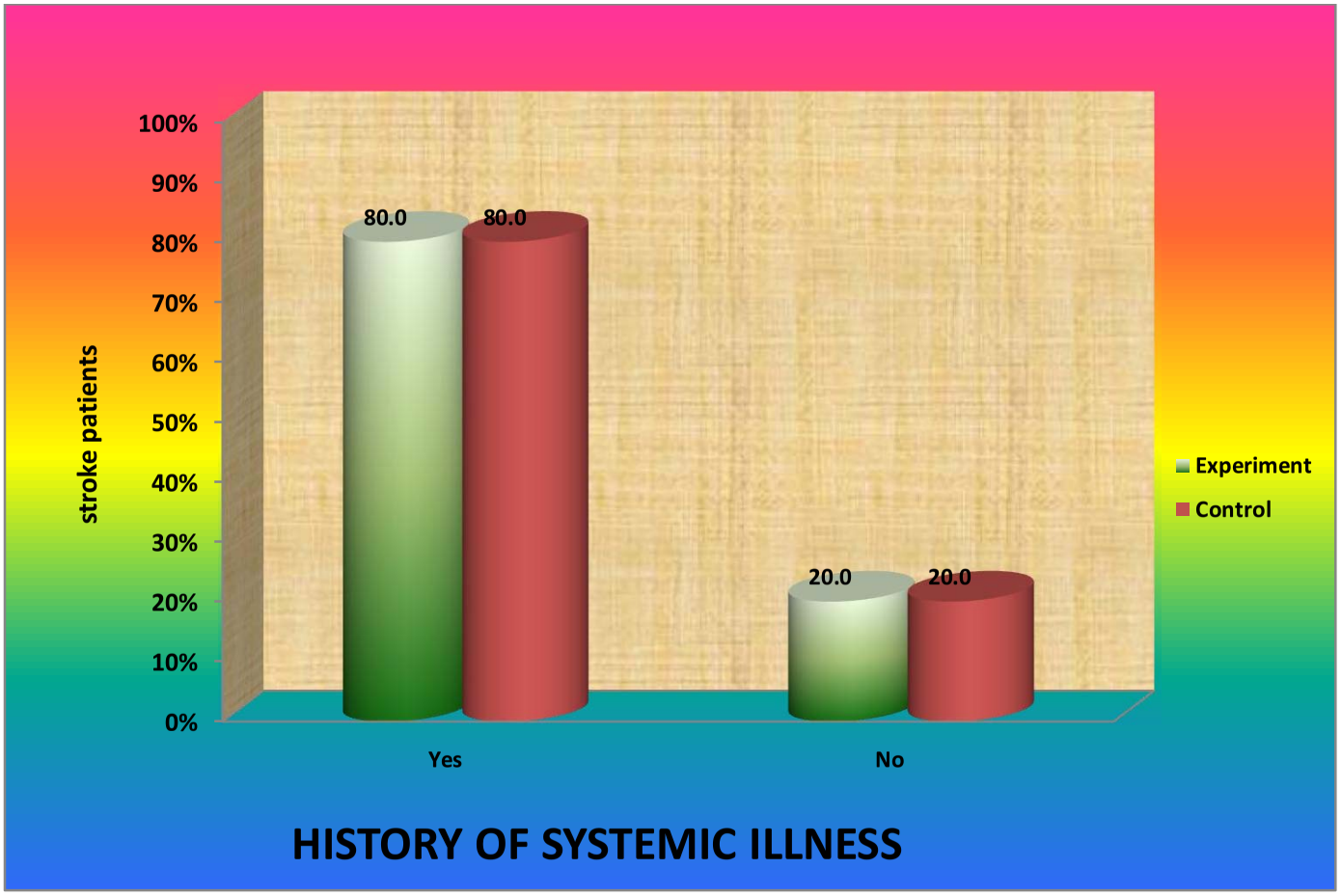


**Figure 4.8 history of illness of the study participants**

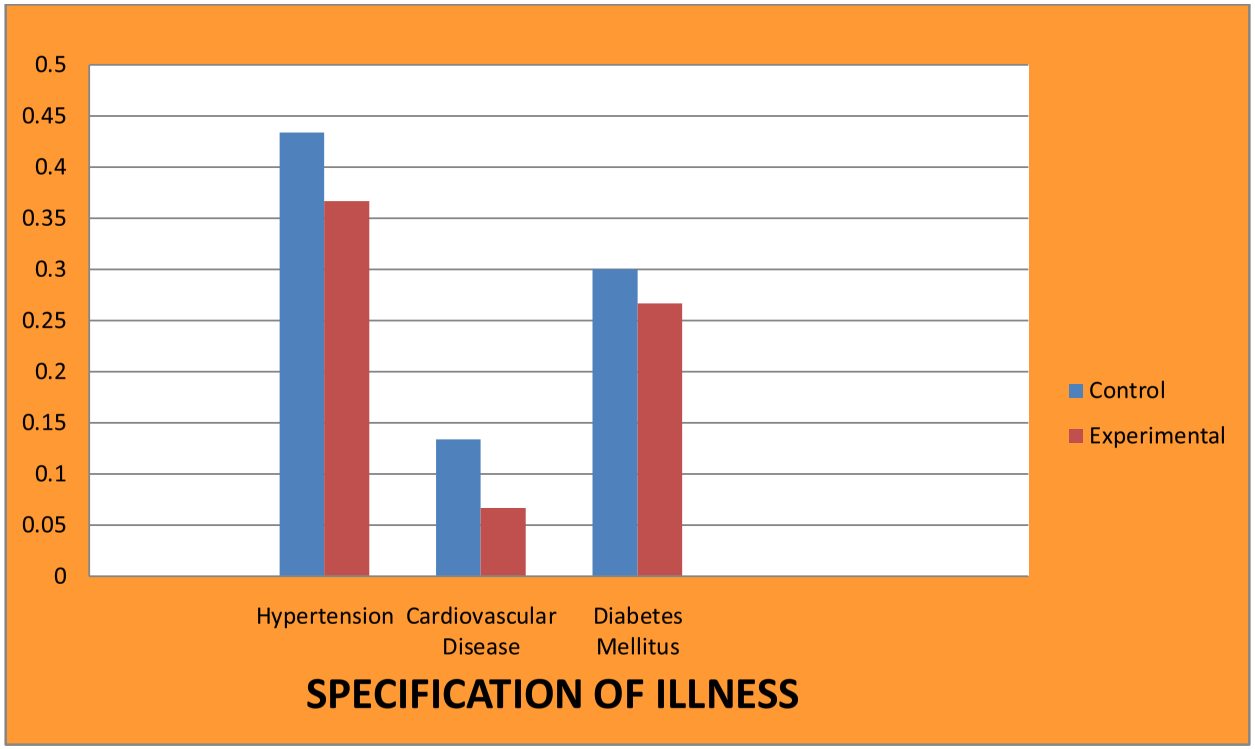


**Figure 4.9 shows the specification of systemic illness among study subjects**

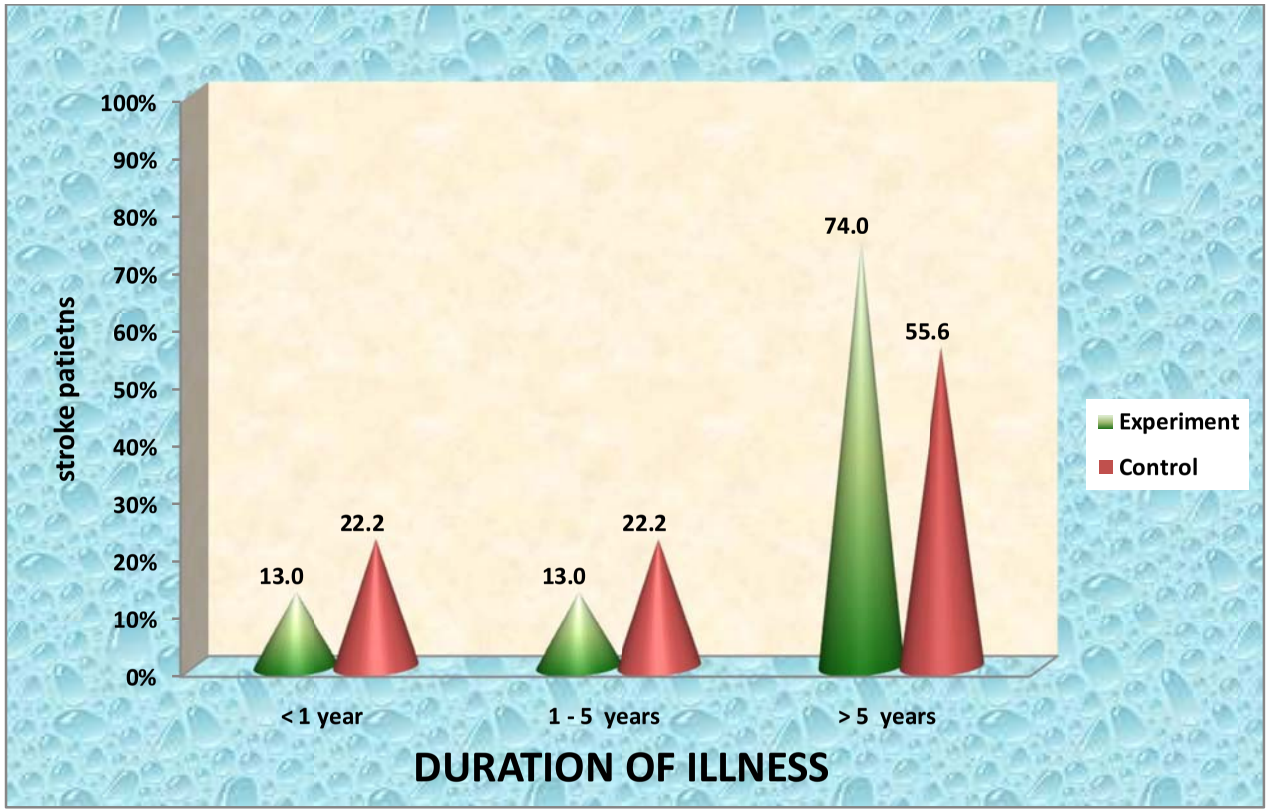


**Figure 4.10 duration of systemic illness of the study participants**

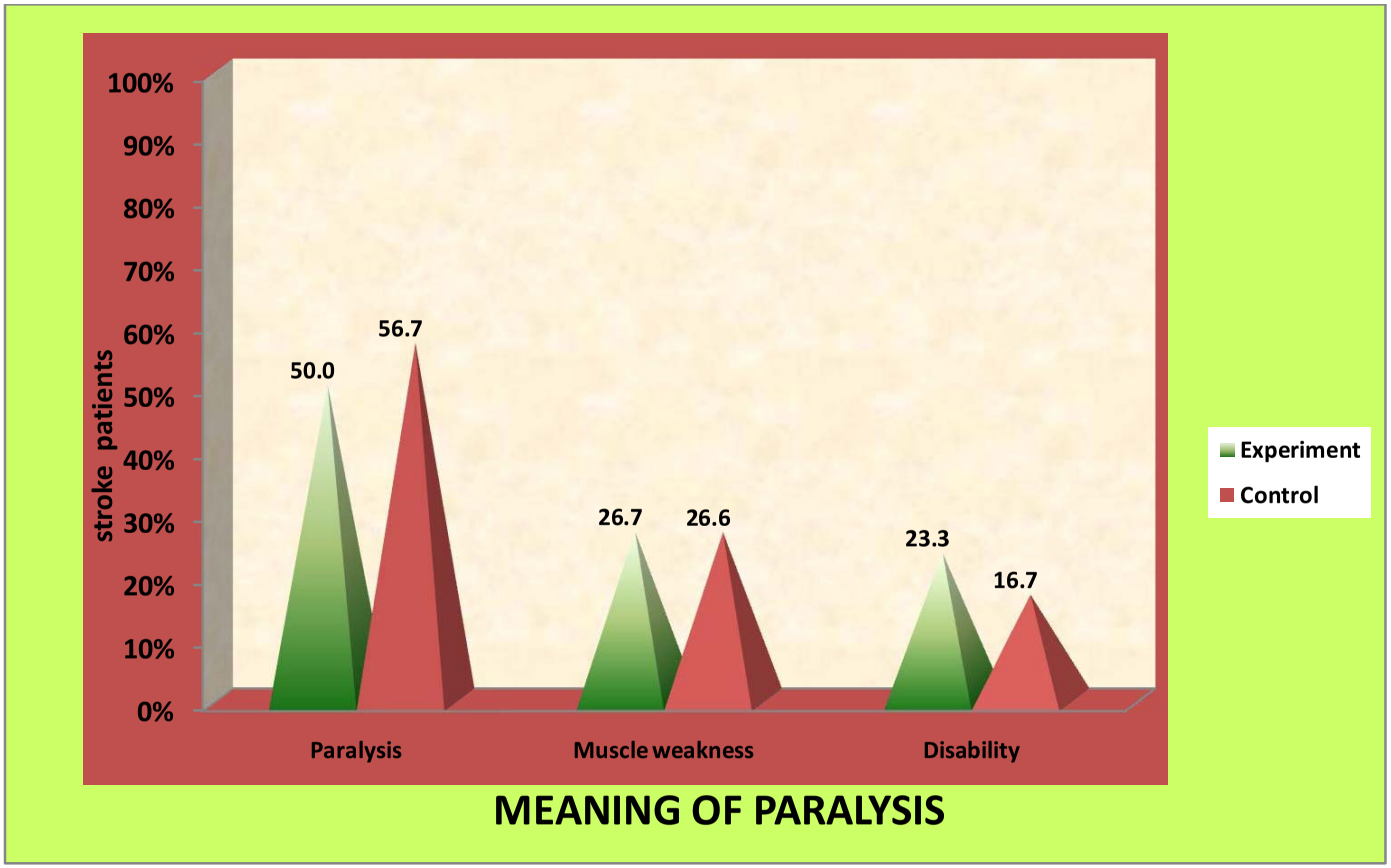


**Figure 4.11 meaning of paralysis according to the study participants**

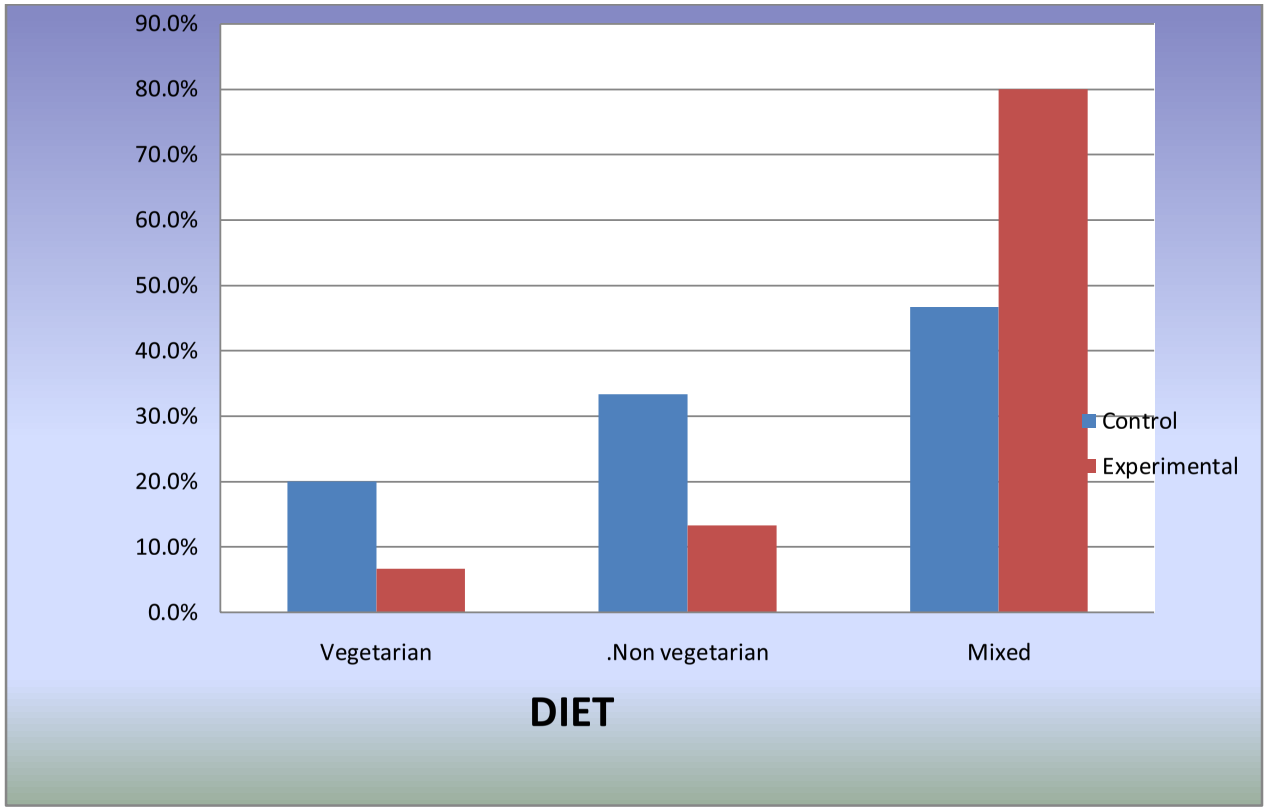


**Figure 4.12 shows the dietary habit of the study participants**

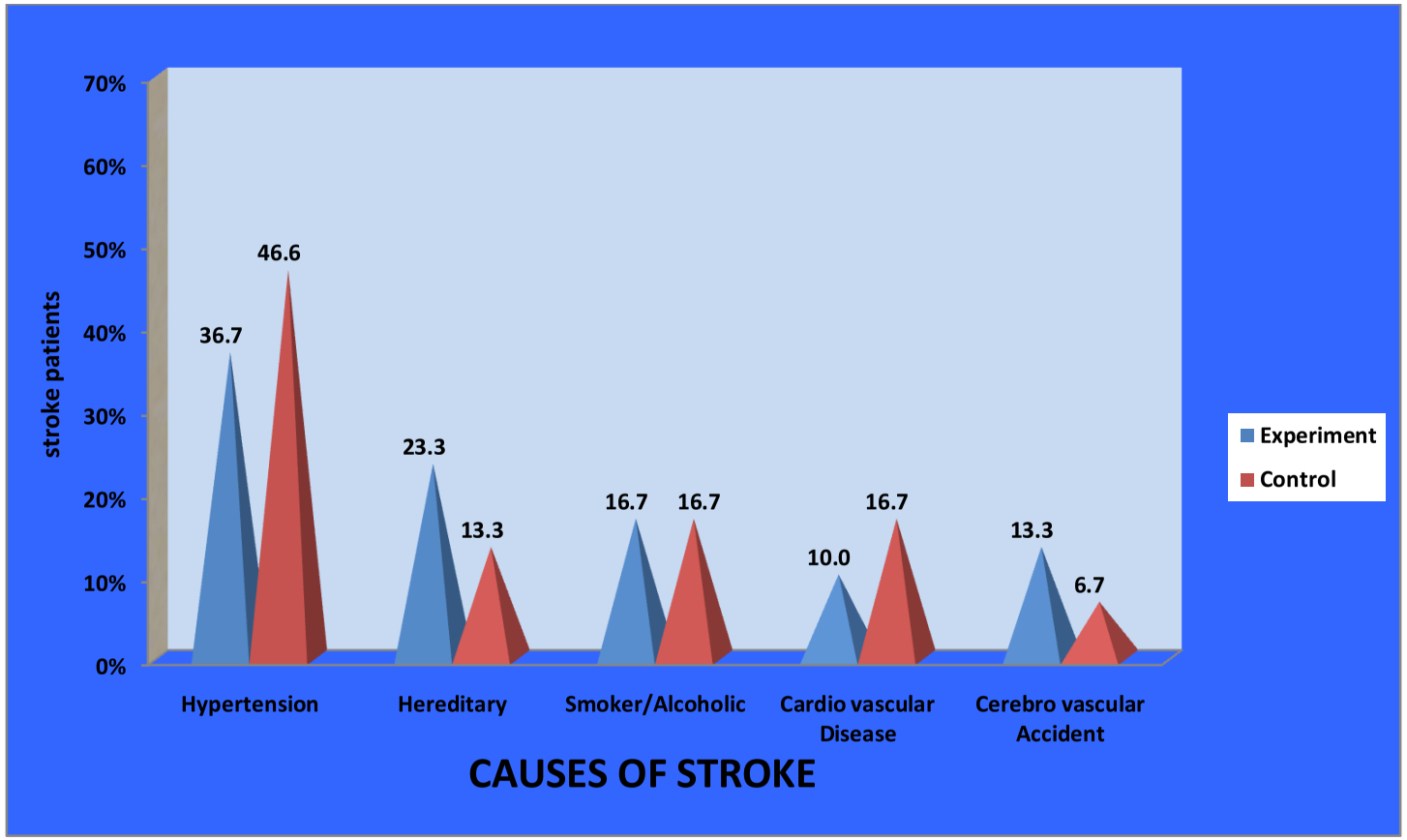


**Figure 4.13 causes of stroke according to the study participants**

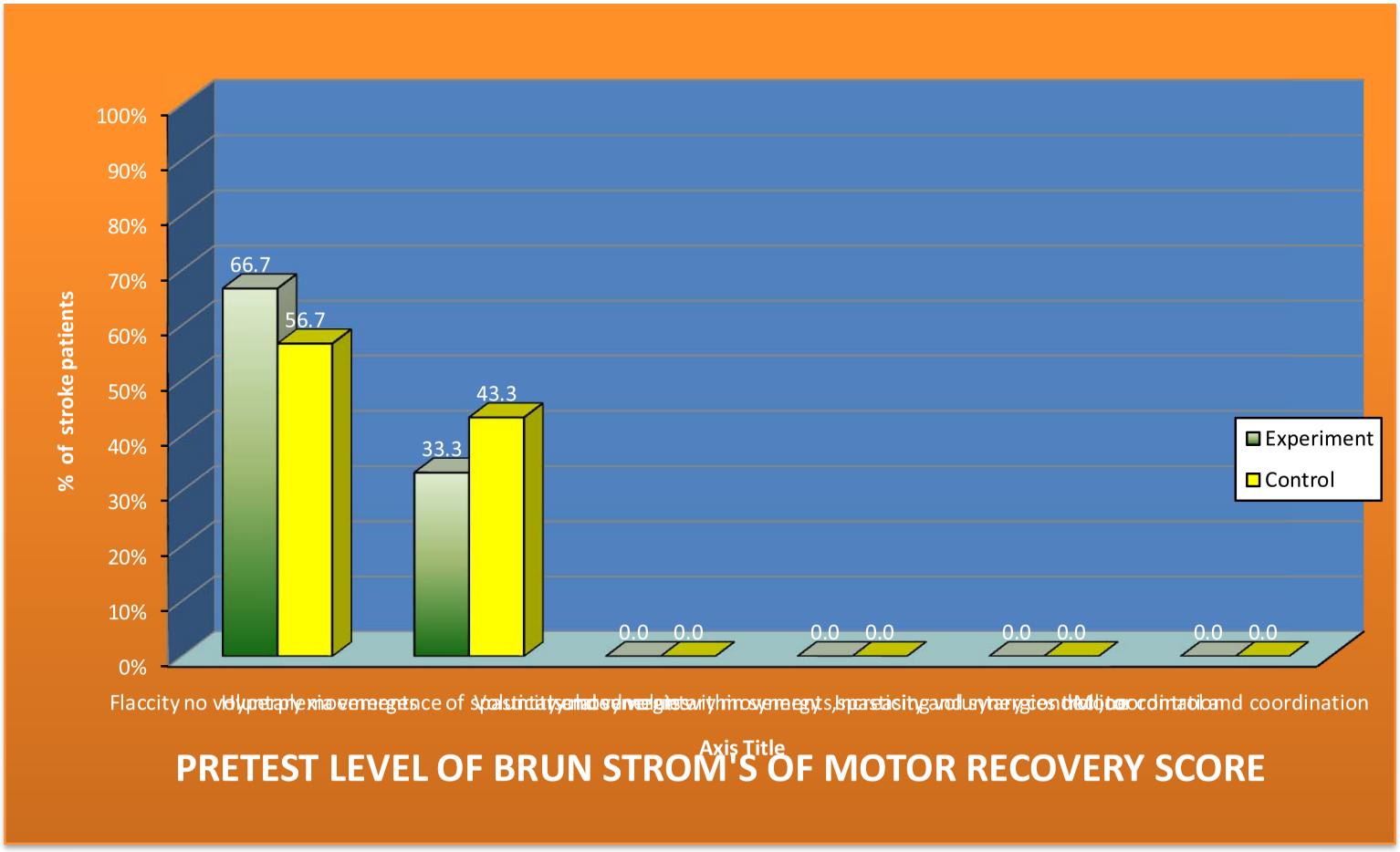


**Figure 4.14 pre test score of Brunnstorm's motor recovery Score of the study participants**

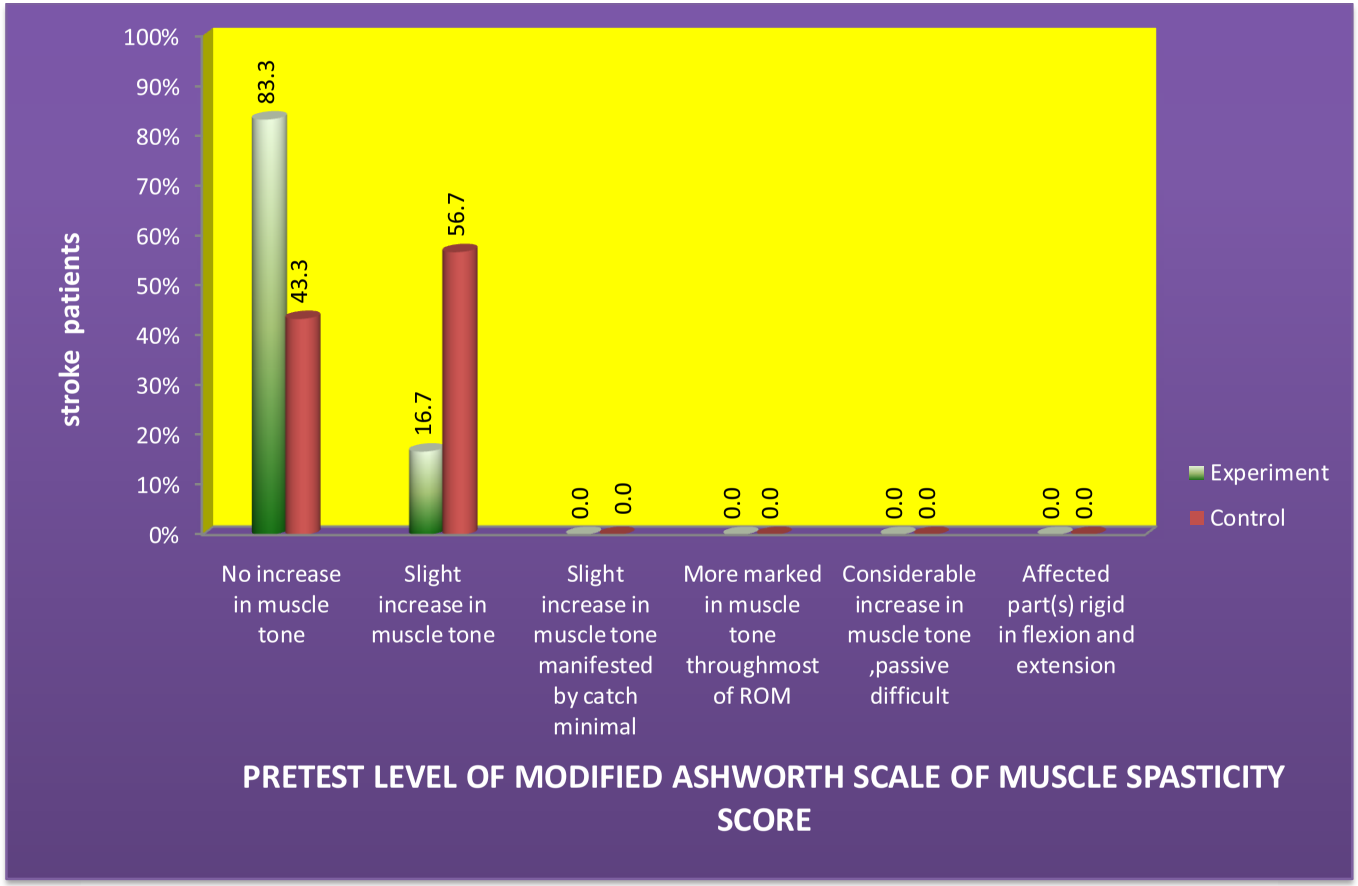


**Figure 4.15 Score of Modified Asworth Scale**

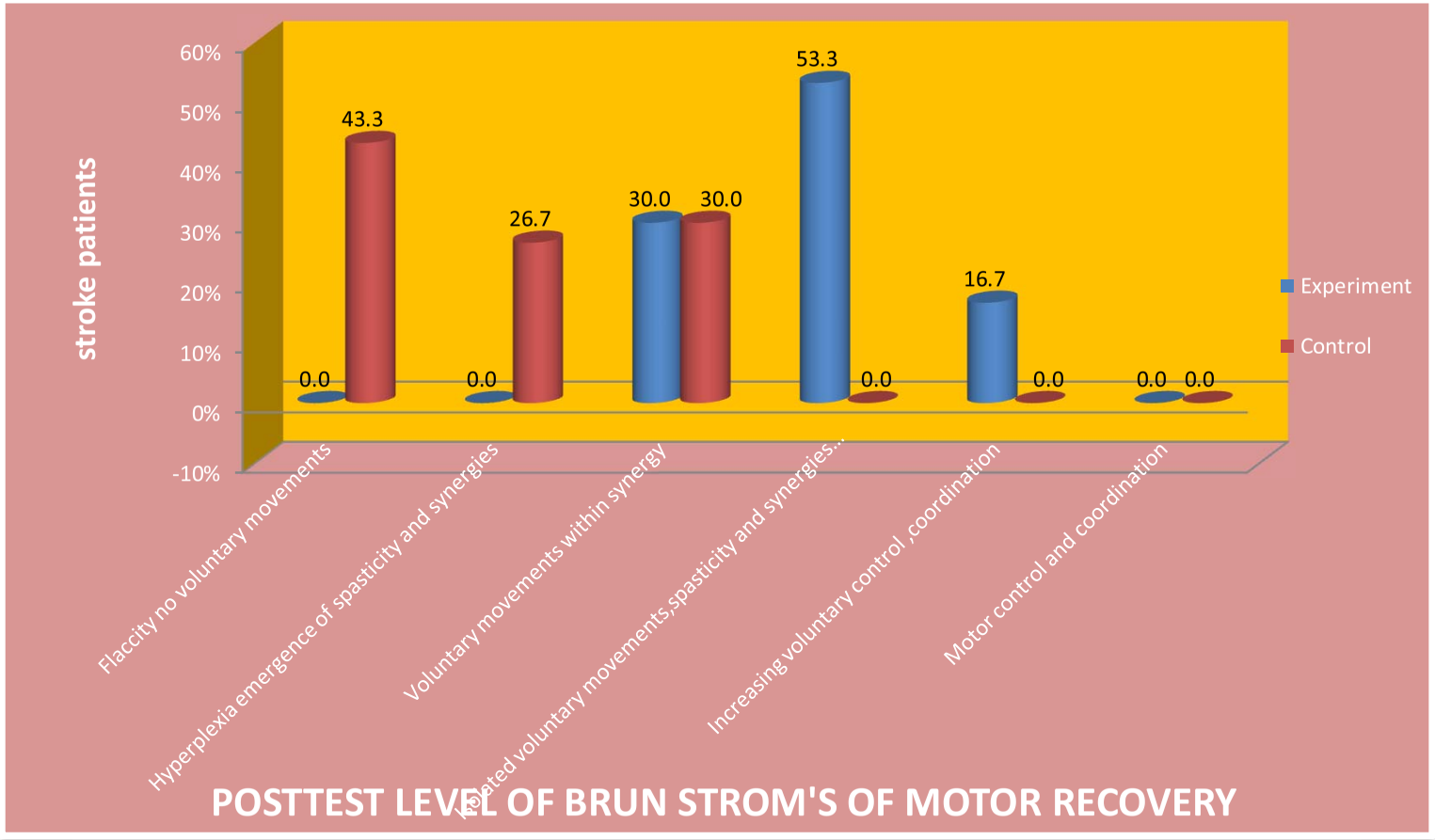


**Figure 4.16 post test assessment of Brunnstrom's motor recovery score**

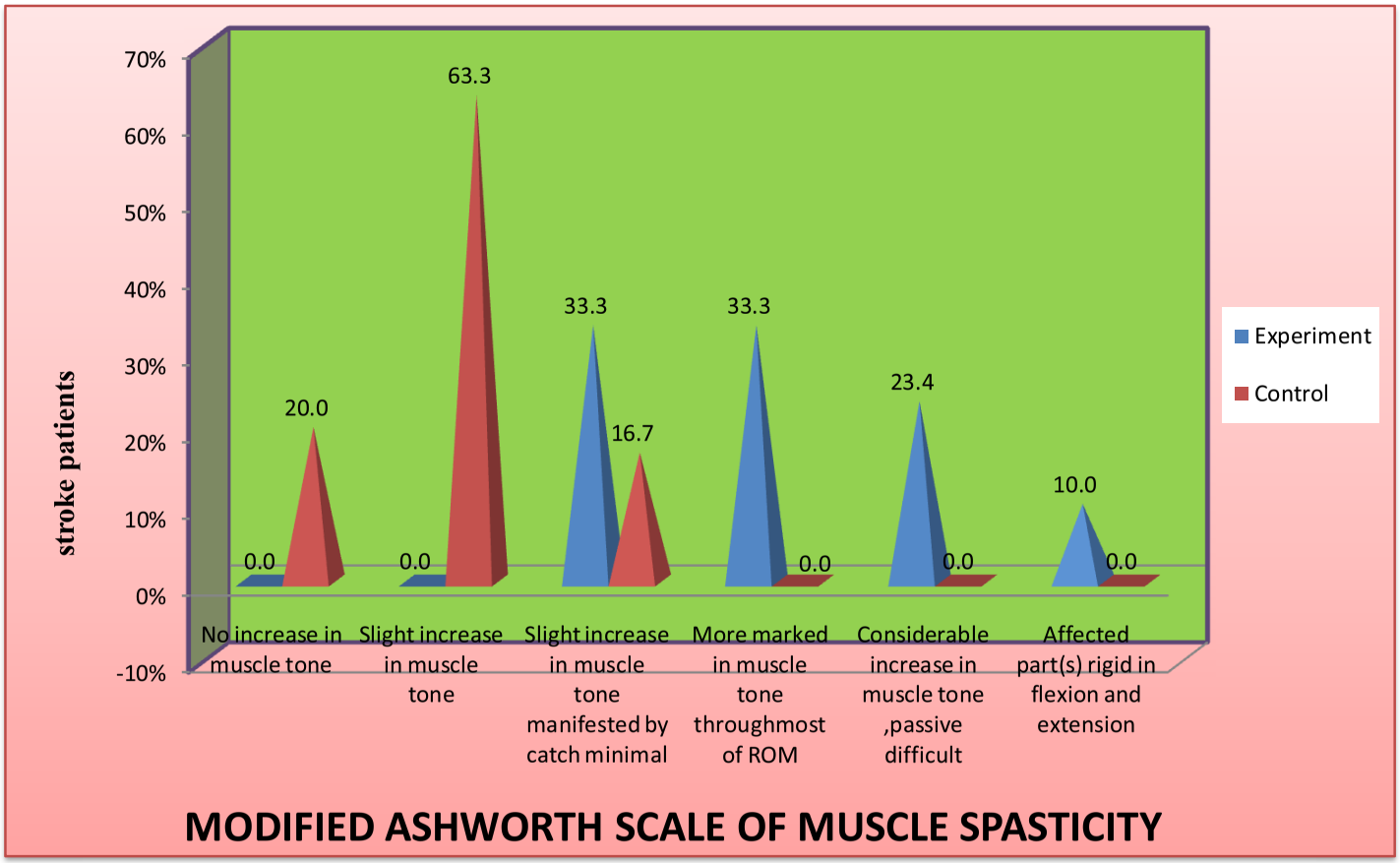


**Figure 4.17 post test score of Modified Asworth scale**

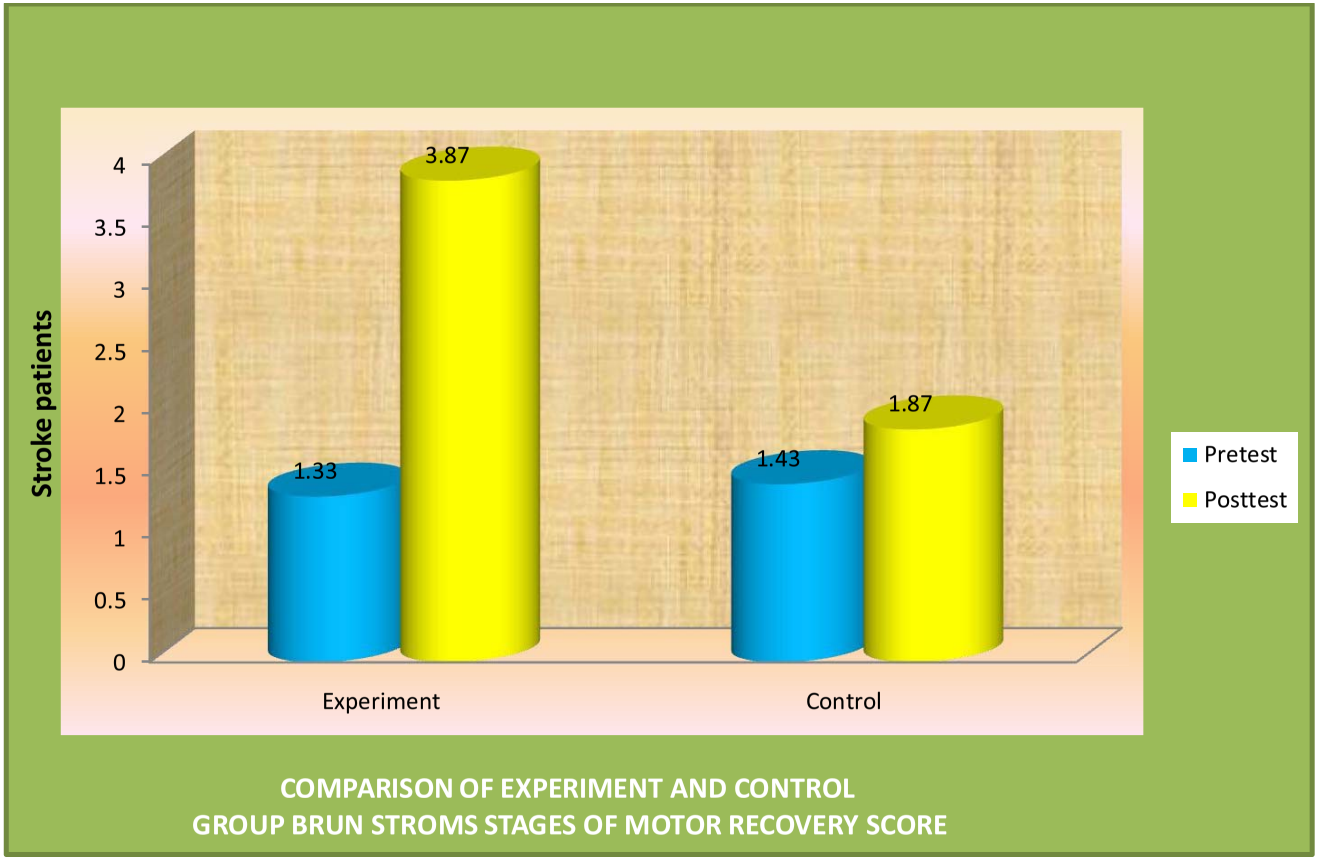


**Figure 4.18 Comparison of Brunnstrom's Scores in experimental and control**

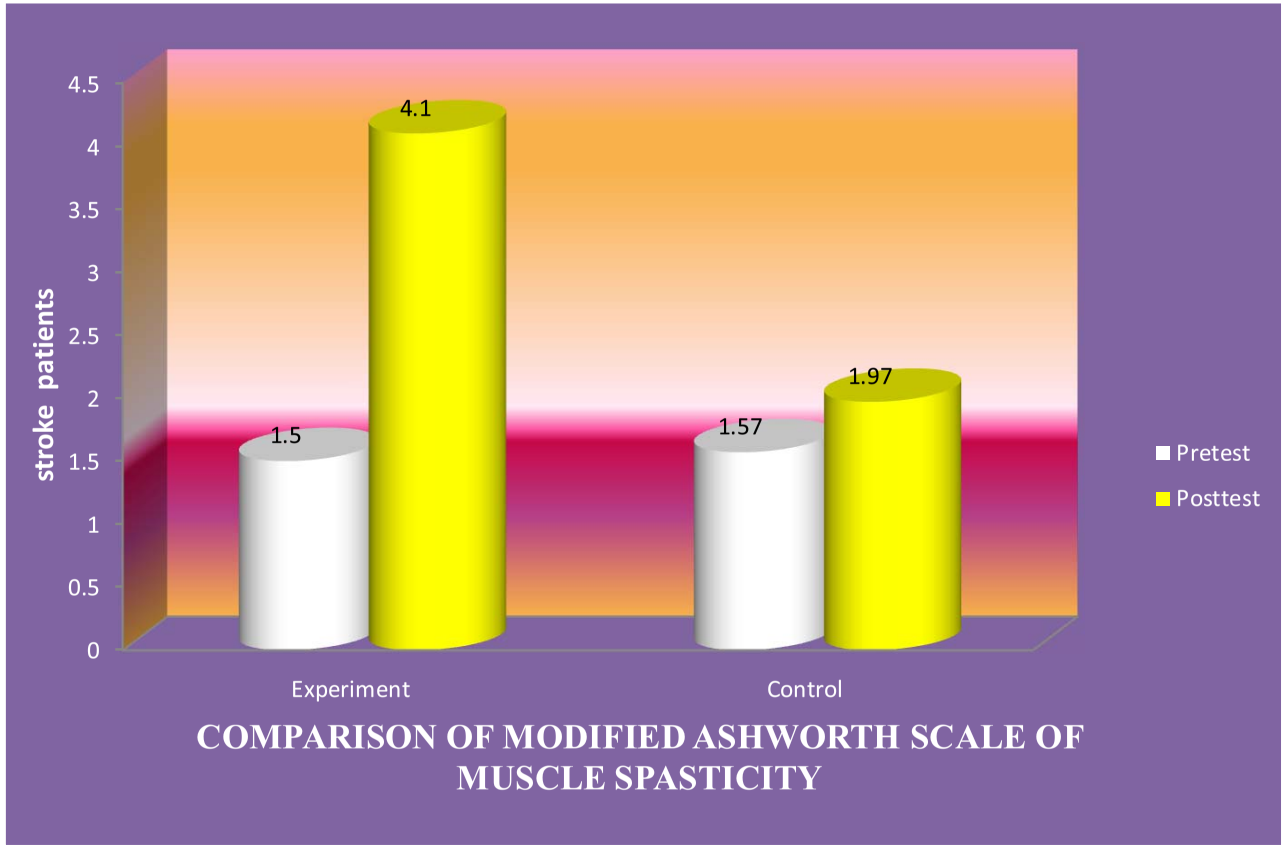


**Figure 4.19 shows the Comparison of modified Asworth scale of experimental and control group**

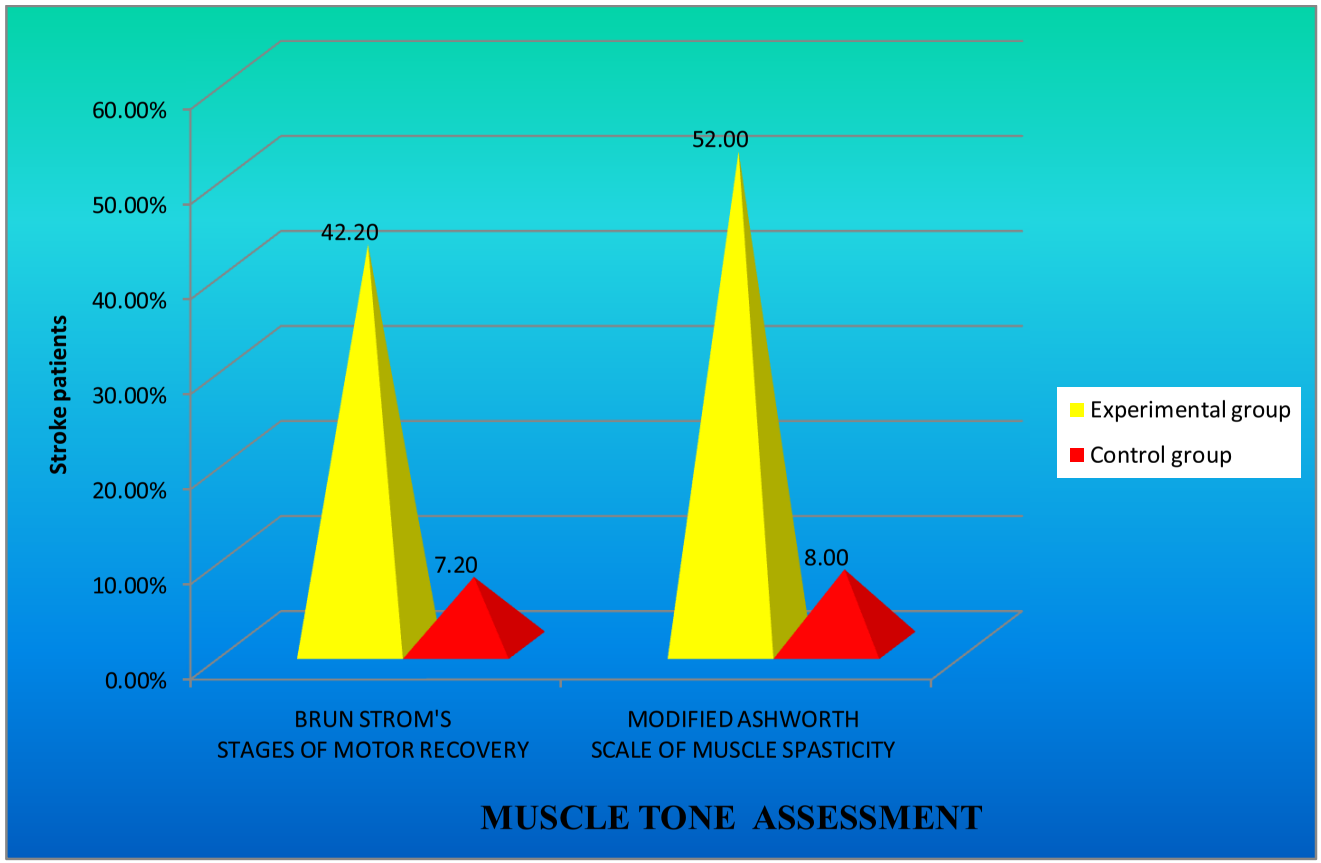


**Figure 4.20 effectiveness of mirror therapy on upper motor functions of clients with stroke**

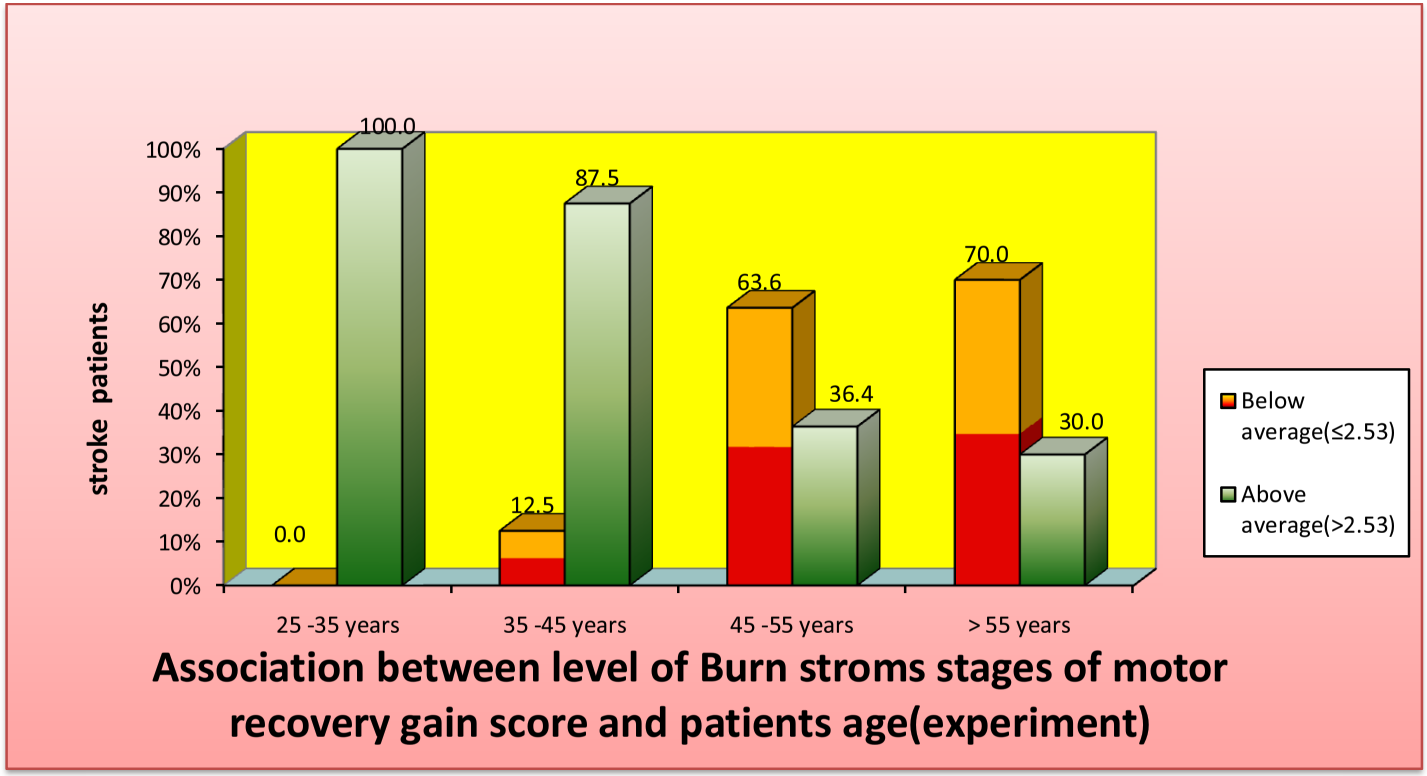


**Figure 4.21 associations between motor recovery gain score and age in clients with stroke**

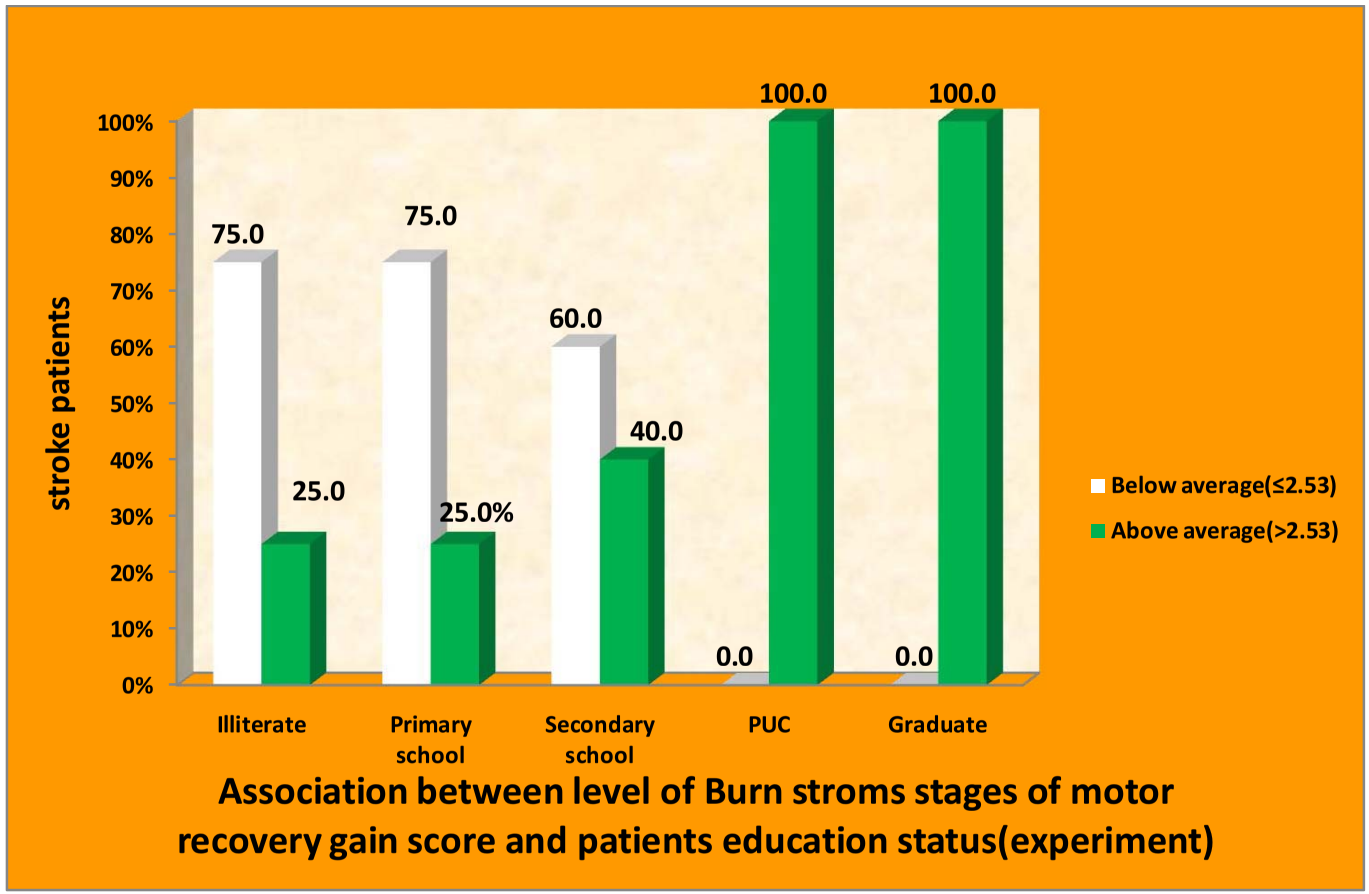


**Figure 4.22 associations between motor recovery gain score and educational status of the clients with stroke**

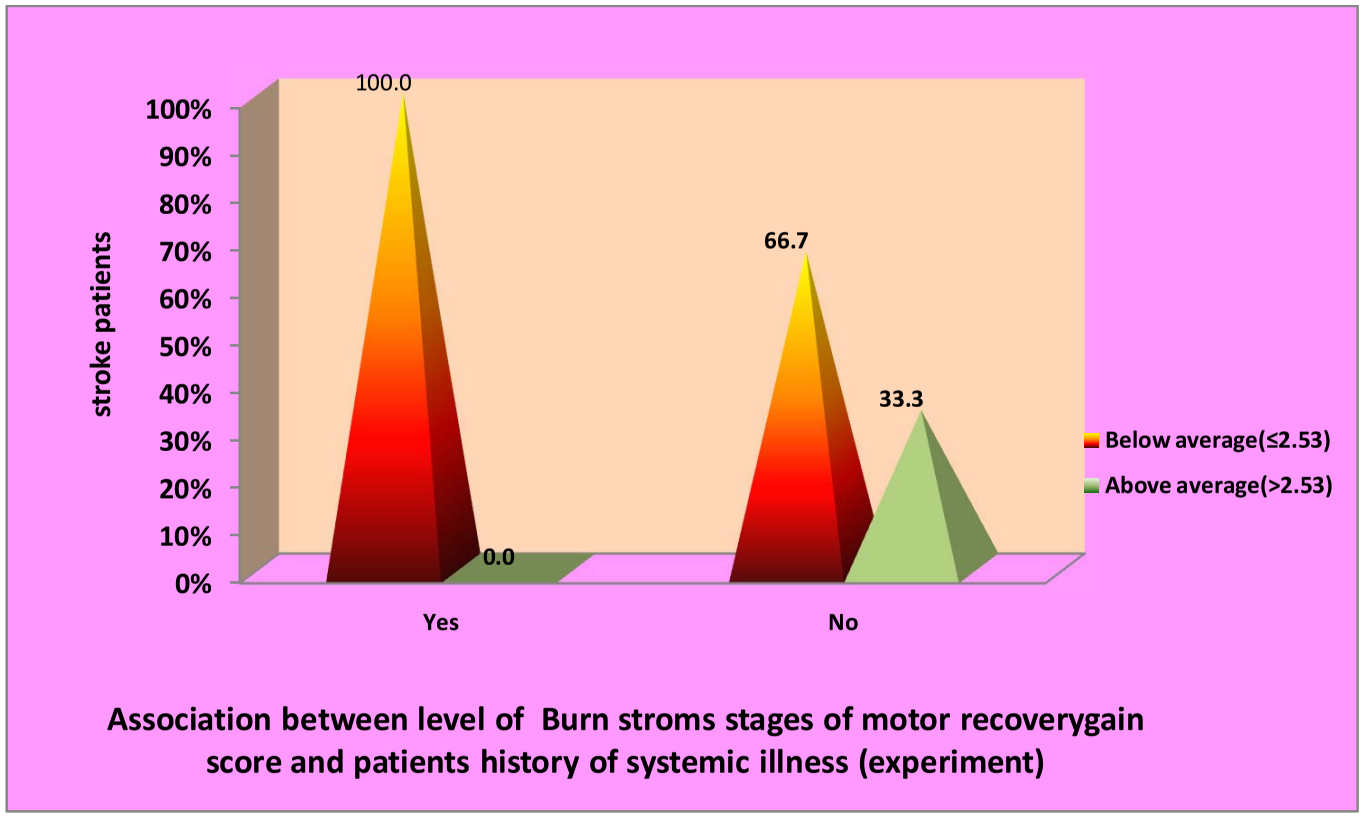


**Figure 4.23 associations between motor recovery gain score and history of systemic illness in clients with stroke**

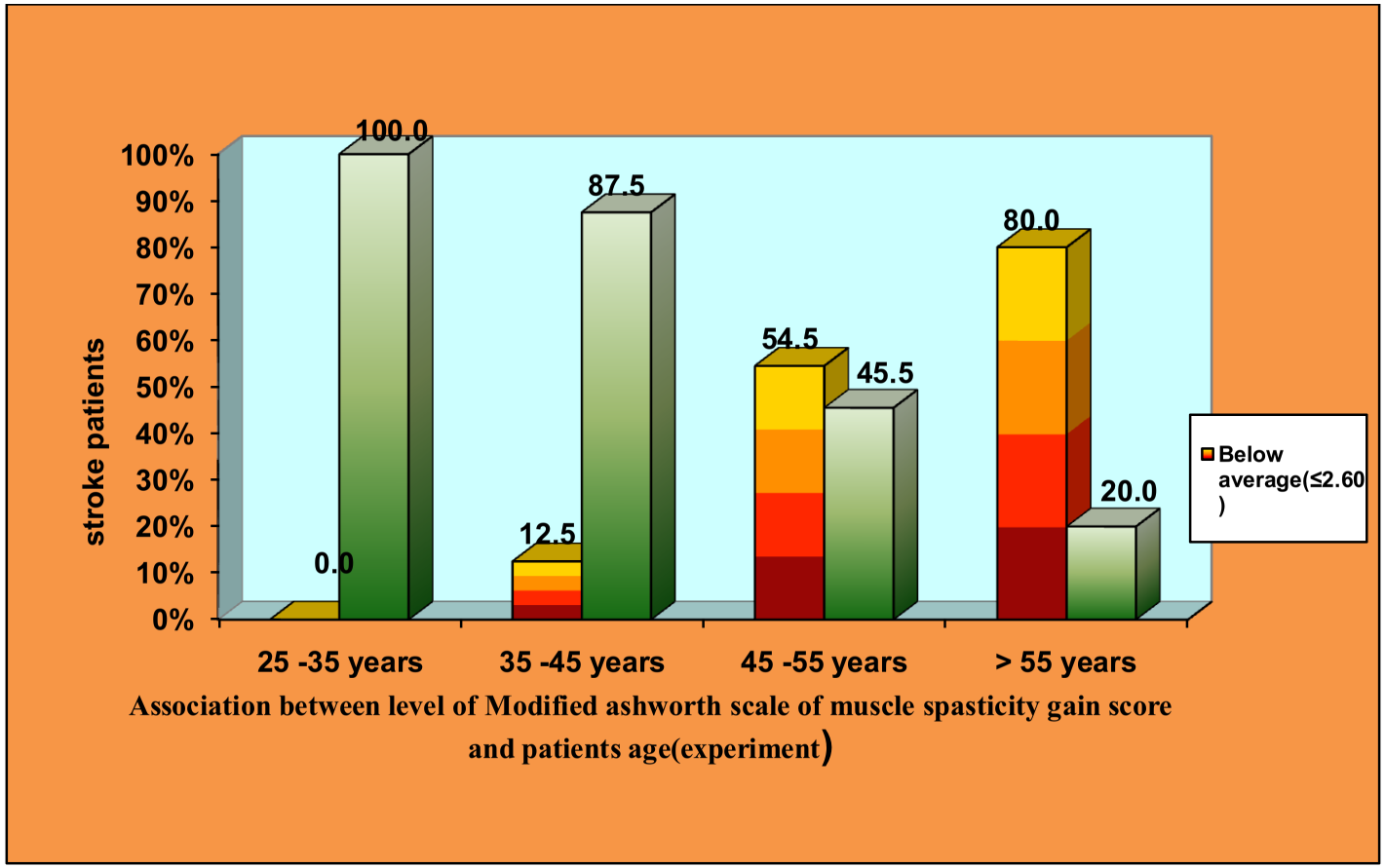


**Figure 4.24** association between level of muscle spasticity gain score and age (experiment)in clients with stroke

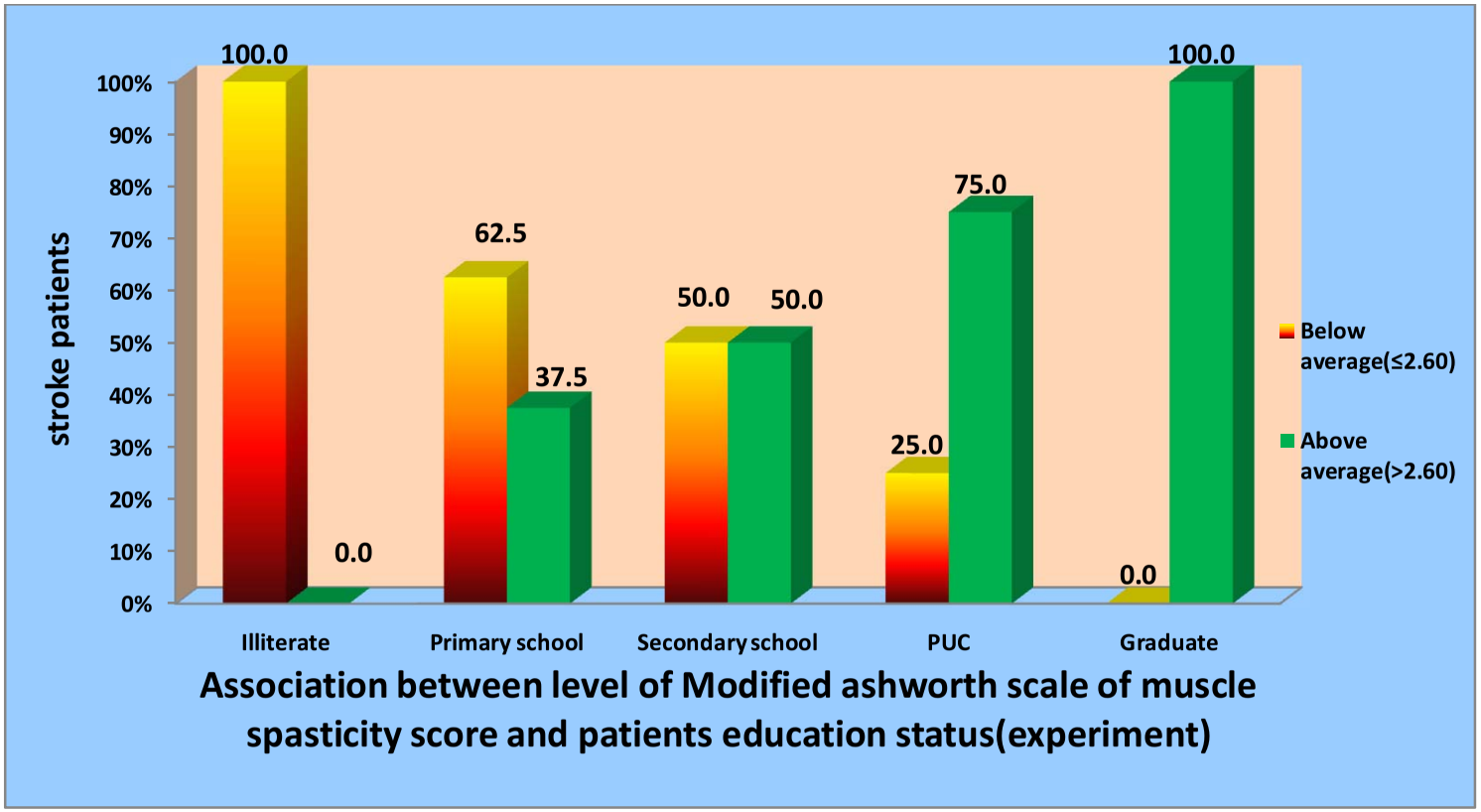


**Figure 4.25 Association between level of muscle spasticity score and education status (experiment) of the clients with stroke**

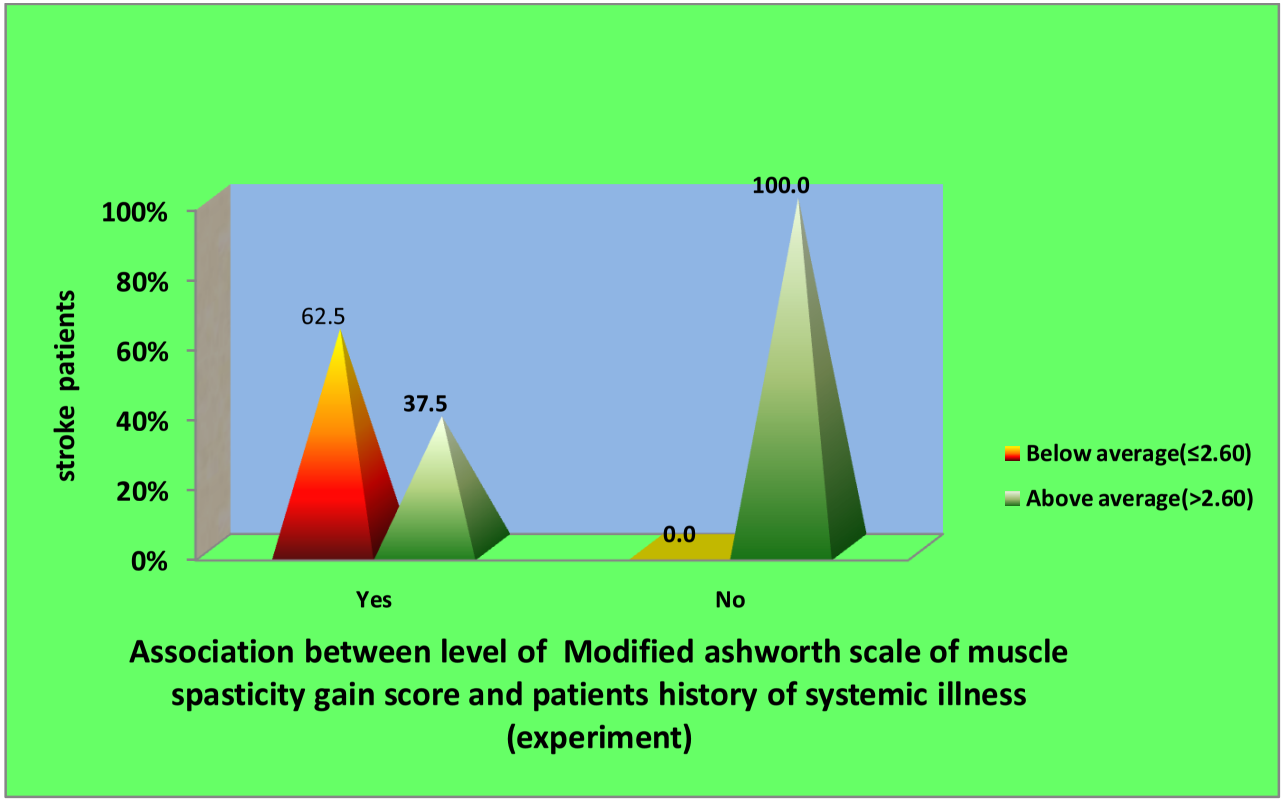


**Figure 4.26 associations between level of muscle spasticity gain score and history of systemic illness (experiment) in clients with stroke**

# CHAPTER V

# SUMMARY OF RESULTS

This chapter deals with all the major findings of the present study, it includes the details of study participant's demographic variables, medical related variables, pre and post test score which was analyzed by MAS and Brunnstrom scale, and the effectiveness of mirror therapy. All this information was given in frequency, proposition, and percentage, the effectiveness was analyzed by paired t test and chi-square value was given to exhibit the significance.

**Findings of demographic variables:**

In demographic variables of the study participants those who were participated in this study (Experimental – 36.7%, Control -43.7%) were between 45-55yrs, about 33.3% in experimental and 26.7% in Control group subjects were between 35-45 yrs, and a very minimal (1%) of subjects were in the age group between 25-35yrs, and about 23.3% in experimental and 33.3% in control group were above 55 years of age

In demographic variable shows male predominance which may be due to the fact that men (66.7%) were more often affected with stroke than women 33.3% in both experimental and control group.

In Educational qualification of both control and experimental group shows some difference. Most of the subjects in experimental group were educated up to primary level (40.0%) and in control group is up to secondary level (33.3%) very minimal percentage of subjects were graduates both in experimental(6.7%) and control (13.3%) group.

Majority of the study subjects were married in both groups (experimental -70.0% and control-73.3%).

Occupation of the study participants were laborers in both groups (46.7%).

Based on the above table 1, the most of the study participants monthly income were between Rs4000-5000 (36.7%). Very minimal percentage of the participants in both group have monthly income above Rs 10,000 (3.3%).

Higher percentage of Hindus participated in this study (experimental-80%, control-63.3%). About 13.3% were Muslims and 36.7% were Christians in experimental group and about 6.7 were Muslims and 13.3% were Christians in Control group.

**Findings of the clinical variables:**

In the disease related information data of the study participants considering both Experimental and Control group (80.0%) majority of the subjects have Systemic illness. Among the participants in experimental group around 45.8% were Hypertensive, 8.3% were Cardiac clients, and 37.5% were Diabetic. In Control group around 41.7% were Hypertensive, 16.7% were Cardiac clients, and 37.5% were Diabetic.

About 74% in experimental and 55.6% Control group clients had the systemic illness more than five years. Very minimal percentage of the study participants had the systemic illness less than one year13.3% (Experimental).and (Control) 22.3%

Most of the study subjects had the knowledge about stroke is nothing but paralysis of body part in experimental it was about 56.6% and in control it was about 50.0%. 26.7% of subjects in both the group consider stroke as a muscle weakness, and about16.7% in experimental and 23.3% in control group felt that stroke means disability of a particular part or organ.

Most of the study participants consumed mixed diet 46.7% (Experimental) and 80% (Control) group. The high percentage 46.7% in experimental and 36.7% in Control group were answered that causes of stroke is due to Hypertension. In this group there was a history of smoking (16.75%)

and cardio vascular diseases (10%). Among the study participants (16.7%) answered that the causes for stroke was smoking in both the group. Around 16.7% in experimental and 10.0% in Control group answered that the causes of stroke were due to cardio vascular diseases.

**Findings of Pre assessment of motor function using BrunnStrom's stages of motor recovery tool and pre assessment of Modified Ashworth Scale.**

In pretest, 66.7% clients in experimental group of flaccidity no voluntary movement and 33.3% had Hyperplexia emergence of spasticity and synergies. In control group clients, 56.7% of clients had flaccidity no voluntary movement and 43.3% of clients had Hyperplexia emergence of spasticity and synergies. Statistically there was significant difference between experiment and control group. It was confirmed using chi square test.

**Findings of Posttest Level Of BrunnStrom's Stages Of Motor Recovery**

In posttest, experimental group clients 30.0% clients had Voluntary movements within synergy, 53.3% had isolated voluntary movements; spasticity and synergies decline and 16.7% had Increasing voluntary control, coordination. In control group, 43.3% of them had Flaccidity no voluntary movements, 26.7% Hyperplexia emergence of spasticity and synergies and 30% of them had Voluntary movements within synergy. Statistically there was a significant difference between experiment and control group. It was confirmed using chi square test

**Findings of Posttest Level Of Modified Ashworth Scale Of Muscle Spasticity**

The above table shows the post test values of Modified Asworth scale of spasticity, it shows there was a significant difference between the pre and post assessment of experimental and control group. $\chi 2=46.67$ $p=0.001^{***}$ this analysis was made using chi square test and it was statistically significant

**Comparison of Pretest And Posttest Level Of BrunnStrom's Stages Of Motor Recovery (Experiment)**

In pretest, experiment clients are having, 66.7% of flaccidity no voluntary movement and 33.3% are having Hyperplexia emergence of spasticity and synergies. In posttest, they are having 30.0% of Voluntary movements within synergy, 53.3% are having Isolated voluntary movements, spasticity and synergies decline and 16.7% are having Increasing voluntary control ,coordination. Statistically there is a significant difference between pretest and posttest. It was confirmed using chi square test.

**Findings of Comparison of Pretest And Posttest Level Of Brun Strom's Stages Of Motor Recovery (Control)**

In pretest, of control group had, 56.7% of clients had flaccidity no voluntary movement and 43.3% clients had Hyperplexia emergence of spasticity and synergies. In posttest, they had 43.3% of clients had flaccidity no voluntary movement, 26.7% had Hyperplexia emergence of spasticity and 30% of them had Voluntary movements within synergy. Statistically there was a significant difference between pretest and posttest. It was confirmed using chi square test.

**Findings of Comparison Of Experiment And Control Group Mean Score**

Both BrunnStrom's scale and Modified Asworth spasticity scale had significant differences between pre and post test. In pretest there was no statistically significant difference between experiment and control group. In posttest there was statistically significant difference between experiment and control group. It was confirmed using student independent t-test. **Burnnstrom's stages for motor recovery t=9.97 p=0.001***, Modified Asworth Scale t=9.99 p=0.001*****

**Findings of Effectiveness of Mirror Therapy on Upper Limb Motor Functions Among Clients with Stroke**

- BRUNNSTROM'S STAGES OF MOTOR RECOVERY: 42.2% of clients in experimental group were benefitted with mirror therapy, where as in control group.7.2% of clients were benefitted with routine treatment.
- MODIFIED ASHWORTH SCALE OF MUSCLE SPASTICITY: 52.2% of clients in experimental group were benefitted with mirror therapy. Only 8.8%of clients in control group were benefitted with routine treatment.

**Association between level BrunnStrom's stages of motor recovery gain score and clients demographic variables (experiment)**

This shows the association of level of gain score with selected demographic variable. Younger, more educated and no other systematic disease clients are benefitted more than others. Statistical significance was calculated using chi square test

**Findings in Association between level modified Asworth scale of muscle spasticity gain score and clients demographic variables (experiment)**

This shows the .association of motor recovery gain score with selected demographic variable. Younger, **($\chi$2=9.19p=0.02),** more educated (**$\chi$2=9.50 p=0.05***) and no other systematic disease clients (**$\chi$2=7.50 p=0.01****) are benefitted more than others. Statistical significance was calculated using chi square test. Statistically significant.

**Findings in Association between level modified Asworth scale of muscle spasticity gain score and clients demographic variables(control)**

In this association of muscle spasticity level of gain score with selected demographic variable. None of the variables were significant. Statistical significance was calculated using chi square test

# CHAPTER VI
# DISCUSSION

This chapter deals with the interpretation of results and discussion of findings. Mirror therapy is relatively new therapeutic intervention that focuses on moving the unimpaired limb. Mirror therapy works under the principle of development of neural pathways through brain plasticity. Mirror therapy involves performing movements of the unimpaired limbs, while watching its mirror reflection superimposed over the impaired limbs that creating visual illusion of enhanced movement capability of the impaired limb.

The study was conducted at Rajiv Gandhi Government General Hospital, Chennai. The present study was intended to assess the effect of Mirror therapy on hand function among Cerebrovascular accident patient. Mirror therapy was given to 30 clients who were suffered Cerebrovascular accident with upper limb weakness. Mirror therapy was given for fourteen days, with three sessions for a day each session lasts 15 to 20 minutes along with routine care. Results are evaluated with Brunnstrom Stage of motor recovery, modified Ashworth scale. Demographic datas were recorded.

The present study focused on assessing the effectiveness of Mirror therapy in improving hand motor function in acute stroke patient. The study samples consist of 60 subjects (30 in experimental group, 30 in control group). The conceptual frame work of this study was based on Donabedian's system approach. Descriptive statistics and inferential statistics were used to analysis the data and to test the hypothesis.

The discussion about the study findings is presented in this chapter to arrive at a conclusion based on the objectives, the related literatures and hypothesis.

**Objective: 1 To assess the demographic variables among the experimental and control group**

According to the distribution of the demographic variables Among the participants majority of them (Experimental – 36.7%, Control -43.7%) are between 45-55yrs, about 33.3% in experimental and 26.7% in Control group subjects were between 35-45 yrs, and a very minimal (1%) of subjects was in the age group between 25-35yrs, and about 23.3%in experimental and 33.3% in control group were above 55 years of age.

According to the table it shows male predominance which may be due to the fact that men (66.7%) are more often affected with stroke than women 33.3% in both experimental and control group.

Educational qualification of both control and experimental group shows some difference. Most of the subjects in experimental group are educated up to primary level (40.0%) and in control group is up to secondary level (33.3%).very minimal percentage of subjects were graduates both in experimental(6.7%) and control (13.3%) group.

This study was supported by Raphael Carandang (1948) conducted a study to determine long-term trends in the incidence, lifetime risk, severity, and 30-day risk of death from clinical stroke. This study included 9,152 Framingham Study original patient and offspring undergoing follow-up for up to 50 years over three consecutive time-periods (1950-1977, 1978-1989, and 1990-2004), with ascertainment of stroke risk factor data every two years and active surveillance for occurrence of stroke or death.

**Objective: 2 To assess the upper limb muscle tone among clients with stoke by using Modified Ashworth Scale among experimental and control group.**

In pretest, experiment clients are having, 66.7% of flaccidity no voluntary movement and 33.3% are having Hyperplexia emergence of spasticity and synergies. In control group clients, they are having 56.7% of flaccidity no voluntary movement and 43.3% are having Hyperplexia

emergence of spasticity and synergies. Statistically there is no significant difference between experiment and control group. It was confirmed using chi square test.

**Objective: 3 To compare the effectiveness of mirror therapy on upper limb motor functions among clients in Experimental group with control group.**

In posttest, experiment 30.0% of clients had voluntary movements within synergy, 53.3%clients had isolated voluntary movements, spasticity and synergies decline and 16.7% clients had increasing voluntary control, coordination. In control, 43.3% of clients have flaccidity no voluntary movements, 26.7% Hyperplexia emergence of spasticity and synergies and 30% voluntary movements within synergy. Statistically there was a significant difference between experiment and control group. It was confirmed using chi square test.

Brunnstorm's stages of motor recovery score, experiment group benefitted 42.2% where as control group with routine treatment benefitted only 7.2%.

Modified Asworth scale of muscle spasticity score, experiment group benefitted 52.2% where as control group with routine treatment benefitted only 8.8%. This difference shows the effectiveness of mirror therapy on upper limb motor functions among clients with stroke admitted in RGGGH ,Chennai.

**This study result is consistent with the study result supported by Stoykov ME, Corcos D. (2009).** Rehabilitation Institute of Chicago, Chicago, IL. Upper extremity hemi paresis is the most common post-stroke disability. Longitudinal studies have indicated that 30-66% of stroke survivors do not have full arm function 6 months post-stroke. Bilateral arm training has been investigated as a potential rehabilitation intervention. Bilateral arm training encompasses a number of methods including: (1) bilateral isokinematic training; (2) mirror therapy using bilateral training; (3) device-driven bilateral training; and (4) bilateral motor priming. Neural mechanisms mediating bilateral training are first reviewed. Finally, conclusions are drawn concerning clinical implications based on the reviewed literature.

**Ezendam D, et'al., May (2009),** Center for Human Movement Sciences, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands, did a systematic review of the effectiveness of mirror therapy in upper extremity function. Two studies focused on mirror therapy after an amputation of the upper limb, five studies focused on mirror therapy after stroke, five studies focused on mirror therapy with complex regional pain syndrome type 1 (CRPS1) clients, one study on mirror therapy with complex regional pain syndrome type 2 (CRPS2) and two studies focused on mirror therapy after hand surgery other than amputation. The present review showed a trend that mirror therapy is effective in upper limb treatment of stroke clients and clients with CRPS, whereas the effectiveness in other patient groups has yet to be determined.

**Objective 4: To identify the association between upper limb motor functions and selected demographic and clinical variables among the experimental and control group.**

The association level of upper limb motor functions gain score with selected demographic variable younger, (**$\chi$2=9.19p=0.02)** more educated (**$\chi$2=9.50 p=0.05***) and no other systematic disease clients were (**$\chi$2=7.50 p=0.01****) benefitted more than others. Statistical significance was calculated using chi square test.

# CHAPTER VII

# SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with the summary of the study, implications for nursing practice, education, nursing research, administration and recommendations for future research.

## 7.1. Summary of the study

The present study was conducted with the objectives to explore the effect of mirror therapy for hand function among Cerebrovascular accident patient. Mirror therapy implementation promotes hand function. Initially, assessment was done and the clients were identified through movement of hand. Mirror therapy was implemented to the experimental group patient, where as no intervention given to the control group patient. Modified Ashworth Scale, Brunnstrom's Stage Recovery, scale was used to assess the hand function in both experimental and control group. There was a significant difference in hand function of the patient between experimental and control group after the implementation of mirror therapy. Donabedian System theory was adopted to identify the need of patient. Review of literature reveals many facts about various alternative and complementary therapies for hand function and highlighted the effect of mirror therapy to improve the hand function of patient among Cerebrovascular accident patient. The study was conducted in selected wards of Rajiv Gandhi Government General Hospital, Chennai. Quasi experimental pretest-post test with control design was adopted for the study. Simple random Sampling Technique was used to select the respondents. Total number of respondents selected was 60. Samples were assigned to experimental (30) and control group (30).

## 7.3. Nursing implications of the study

According to Tolsma (1995) the selection of research report that focuses on implication usually includes specific suggestion for nursing practice, education, administration and research.

### 7.3.1. Nursing practice

Advanced nursing practice is one of the evolving trends in nursing practice, in which the hospital has a definite specified role for the nurse, a nurse specialist play a pivotal role in helping the patient to reduce discomfort and promote the comfort by providing quality care and preventing complications. Nurses have vital role in care for stroke clients.

The use of mirror therapy is more effective with continued practice. It would be really beneficial to include the teaching of mirror therapy in their routine daily activity.

### 7.3.2. Nursing education

Complementary and alternative therapies are those therapies that are used in addition to conventional treatment recommended by health care provider. There exists several types of complementary therapies and one among them is mirror therapy that is nursing accessible therapy. So the nurses should update their knowledge and skills. This mirror therapy can be very well incorporate as an alternative therapy in curriculum as a part of holistic approach.

Before, the nurses can utilize their practice; they need to have a strong foundation and knowledge through education from the inception of nursing as a nurse student till they graduate as professional nurses. They have to learn keeping with the changing trends. The nurse should have up-to date knowledge regarding the treatment modalities.

### 7.3.3 Nursing administration

Nursing administrator should conduct in service education program aimed at reduction of pain and improve the physical and mental condition of the subjects with non pharmacological methods.

1) Administrators should motivate the health personnel to demonstrate the mirror therapy through video or directly demonstrated to the subjects in order to reduce the pain and improve hand function.
2) Nurse administrators should arrange for periodic joint discussion about Mirror therapy among nurses and doctors. She can also arrange Inter professional learning of this therapy with other departments like occupational therapy, physio therapy etc.
3) Nurse administrators should provide the time, place and material for the nurse to educate the subjects on self practice of Mirror therapy

### 7.3.4 Nursing research

Continuing research activity and health education will make the public to understand the importance and in service education for health personnel, will helps to improve the comfort of clients and maximum improvements in hand motor functions.

## 7.4 Limitations of the study

The study was confined to a small sample in a single setting in a shorter period that limits the generalization.

## 7.5. Recommendations

1. Mirror visual feedback can be compared with other therapeutic approaches to get good results.

2. The study could be carried out with the long term follow-up and large sample size.

3. More research is needed to further explore the real benefits on mirror visual feedback approach in reducing post-stroke disability.

4. Dominant and non-dominant involvement could be analysed separately

**Conclusion**

The hand function of stroke patient is an inevitable event irrespective of age, and paralytic side of the stroke patient. There are many non pharmacological approaches were tested to improve the comfort level of the stroke patient by improving hand function, in that mirror therapy proved to be more effective in improving hand function. Hence, the mirror therapy intervention can be incorporates as a nursing implication to promote comfortness of the stroke patient

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**INSTITUTIONAL ETHICS COMMITTEE**
**MADRAS MEDICAL COLLEGE, CHENNAI-3**

EC Reg No.ECR/270/Inst./TN/2013
Telephone No. 044 25305301
Fax : 044 25363970

**CERTIFICATE OF APPROVAL**

To
Mrs. D.JOTHI SUBBULAKSHMI,
M.Sc., (Nursing),
College of Nursing,
Madras Medical College,
Chennai – 600 003.

Dear Mrs. D.JOTHI SUBBULAKSHMI,

The Institutional Ethics Committee has considered your request and approved your study titled **A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIMB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI. No.34102014.**

The following members of Ethics Committee were present in the meeting held on 21.10.2014 conducted at Madras Medical College, Chennai-3.

| | | |
|---|---|---|
| 1. | Dr.C.Rajendran, M.D., | : Chairperson |
| 2. | Dr.R.Vimala, M.D., Dean, MMC, Ch-3 | : Deputy Chairperson |
| 3. | Prof.B.Kalaiselvi, M.D., Vice-Principal, MMC, Ch-3 | : Member Secretary |
| 4. | Prof.R.Nandhini, M.D., Inst.of Pharmacology, MMC | : Member |
| 5. | Prof.K.Ramadevi, Director i/c, Inst.of Biochemistry, MMC | : Member |
| 6. | Prof.Saraswathy, M.D., Director, Pathology, MMC, Ch-3 | : Member |
| 7. | Prof.S.G.Sivachidambaram, M.D., Director i/c, Inst.of Internal Medicine, MMC | : Member |
| 8. | Dr.Raghumani, M.S., Professor of Surgery, MMC | : Member |
| 9. | Thiru S.Rameshkumar, Administrative Officer | : Lay Person |
| 10. | Thiru S.Govindasamy, B.A., B.L., | : Lawyer |
| 11. | Tmt.Arnold Saulina, M.A., MSW., | : Social Scientist |

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

1/11/14

Member Secretary, Ethics Committee

**From**

Durairaj Jothi Subbulakshmi,
M.Sc.,(N) II Year,
College of Nursing,
Madras Medical College,
Chennai-03.

**To**

The Professor and Head of The Department,
Institute of Neurology,
Rajiv Gandhi Government General Hospital,
Chennai-03.

**Through**

The proper channel

**Respected Sir /Madam,**

Sub:Permission for conducting study in Neurology Department at Rajiv Gandhi Government General Hospital –requested –regarding

I Durairaj Jothi subbulakshmi, M.Sc (N) II year student ,College of Nursing ,Madras Medical college ,Chennai in partial fulfillment of M.Sc ., Nursing course ,have a plan to conduct research study on topic mentioned below at Neurology Department ,Rajiv Gandhi Government General Hospital ,Chennai -600 003. The study period is 06.07.2015 to 31.08.2015. I assure that I will not interfere with the routine activity of the department.

The topic is **"A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIMB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL,CHENNAI-03"**.

Kindly consider my request and permit me to conduct the Research study.

Thanking you

Yours sincerely,

Date : 01.07.2015
Place : Chennai. 03

Prmpl i/c 01.07.15 forwarded Deli 01/07/15

Permitted

Dr. K. BHANU, D M (Neuro ) FMMC.
Reg. No 36786
Director, Institute of Neurology
& Professor of Neurology,
Madras Medical College &
Govt. General Hospital
Chennai - 600 003.

**From**

Durairaj Jothi Subbulakshmi,
M.Sc.,(N) II Year,
College of Nursing,
Madras Medical College,
Chennai-03.

**To**

The Director
Internal Medicine,
Rajiv Gandhi Government General Hospital,
Chennai-03.

**Through**

The proper channel

**Respected Sir /Madam,**

Sub: Permission for conducting study in Medical Wards at Rajiv Gandhi Government general hospital –requested –regarding

I Durairaj Jothi subbulakshmi,M.Sc (N) II year student ,College of Nursing ,Madras Medical college ,Chennai in partial fulfillment of M.Sc ., Nursing course ,have a plan to conduct research study on topic mentioned below, in Medical Wards ,Rajiv Gandhi Government General Hospital ,Chennai -600 003.The study period is 06.07.2015 to 31.08.2015. I assure that I will not interfere with the routine activity of the department.

Permitted
01.07.15
Forwarded
Delhi
01/07/15

The topic is **"A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIMB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL,CHENNAI-03"**.

Kindly consider my request and permit me to conduct the Research study.

Thanking you

Yours sincerely,

Date : 01.07.2015
Place : Chennai.03

Permitted
9/7/15

Dr. K. SRINIVASAGALIJ, M.D.,
Director & Professor
Institute of Internal Medicine
MMC & RGGGH, Chennai-600 003.

## CERTIFICATE FOR CONTENT VALIDITY

This is to certify that a tool prepared by **Ms.Durairaj Jothisubbulakshmi** , studying M.Sc.,Nursing II year, College of Nursing, Madras Medical College, undertaking a Research study on **"A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIMB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL,CHENNAI-03",** has been validated by me and is found to be valid upto date and she can proceed with this tool to conduct the main study.

Name : Dr. K. BHANU, D.M.(Neuro) FMMC SIGNATURE WITH SEAL
Reg. No. 36786
Director, Institute of Neurology
& Professor of Neurology
Madras Medical College &
Govt. General Hospital
Chennai - 600 003.

Designation :

Date : 17.07.15

Place Chennai.

## CERTIFICATE FOR CONTENT VALIDITY

This is to certify that a tool prepared by **Ms.Durairaj Jothisubbulakshmi** , studying M.Sc.,Nursing II year, College of Nursing, Madras Medical College, undertaking a Research study on **"A STUDY TO ASSESS THE EFFECTIVENESS OF MIRROR THERAPY ON UPPER LIMB MOTOR FUNCTIONS AMONG PATIENTS WITH STROKE ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL,CHENNAI-03",** has been validated by me and is found to be valid upto date and she can proceed with this tool to conduct the main study.

Name DR. TAMILARASI. B

Designation : PRINCIPAL

Date : 15.07.2015

Place CHENNAI.

SIGNATURE WITH SEAL

PRINCIPAL
MADHA COLLEGE OF NURSING
MADHA NAGAR, KUNDRATHUR,
CHENNAI - 600 069
PHONE : 24780736

MADHA COLLEGE OF NURSING
15 JUL 2015
CHENNAI - 600 069

# QUESTIONARIRE

**Section-A:Demographic Data.**

**1) Age in years**

1. 25-35 years ☐
2. 35-45 years ☐
3. 45-55 years ☐
4. Above 55 years ☐

**2) Gender**

1.Male ☐

2.Female ☐

3.Trans gender ☐

**3) Marital status**

1. Married ☐

2. Unmarried ☐

3. Widow/Widower ☐

4..Divorced ☐

**4) Educational status**

1. Illiterate ☐
2. Primary school ☐
3. Secondary school ☐
4. PUC ☐
5. Graduate ☐
6. Others,Specify ☐

**5) Occupation**

1.House wife ☐

2. Labourer ☐

3.Business ☐

4.Government ☐

**5.Others,Specify** _____

**6. Family Monthly Income in Rupees**

1.Rs.2000 – 3000 ☐

2.Rs. 3000 – 4000 ☐

3.Rs.4000 –5000 ☐

4.Rs.5000—10000 ☐

5.Above Rs.10000 ☐

**7). Religion**

1.Hindu ☐

2.Muslim ☐

3.Christian ☐

4.Others ☐

## SECTION—B

### Disease related information-Data

**1). History of any systemic illness**

1. Yes ☐
2. No ☐

**2). If yes ,Specify**

1. Hypertension ☐
2. Cardiovascular Disease ☐
3. Diabetes Mellitus ☐

**3). Duration of illness**

1. > 1 year ☐
2. < 1 year ☐
3. Above 5 years ☐

**4). What do you mean by stroke**

1. Paralysis ☐
2. Muscle weakness ☐
3. Disability ☐

**5). Diet**

1. Vegetarian ☐
2. Non vegetarian ☐
3. Mixed ☐

**6). Causes of stroke**

1. Hypertension ☐
2. Heriditary ☐
3. Smoker/Alcoholic ☐
4. Cardio vascular Disease ☐
5. Cerebro vascular Accident. ☐

**7). Assessment scale.BRUN STROM'S STAGES OF MOTOR RECOVERY.**

1. Grade 1.Flaccity No voluntary movements

2. Grade 2.Hyperplexia emergence of spasticity and synergies

3. Grade 3.Voluntary movements within synergy

4. Grade 4.Isolated voluntary movements,spasticity and synergies decline

5. Grade 5.Increasing voluntary control ,coordination

6. Grade 6. Motor control and coordination

**8). Assessment Scale.MODIFIED ASHWORTH SCALE OF MUSCLE SPASTICITY**

1.Grade 0 –No increase in muscle tone

2 Grade 1 –Slight increase in muscle tone

3.Grade 2 –Slight increase in muscle tone manifested by catch minimal

4.Grade 3 – More marked in muscle tone throughmost of ROM

5. Grade 4 –Considerable increase in muscle tone ,passive difficult

6. Grade 5 – Affected part(s) rigid in flexion and extension.

# BRUNN STROM'S STAGES OF MOTOR RECOVERY

Name of the Patient:

Age : Sex:

I.P No. :

| Movements | Score | No of days | | | | | | | | | | | | | | Pretest | Posttest | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | | |
| Flaccidity, no voluntary movements | 1 | | | | | | | | | | | | | | | | | |
| Hyperplexia Emergence of spasticity and synergies | 2 | | | | | | | | | | | | | | | | | |
| Voluntary movements within synergy, spasticity increases peak | 3 | | | | | | | | | | | | | | | | | |
| Isolated voluntary movements , spasticity and synergies decline | 4 | | | | | | | | | | | | | | | | | |
| Increasing voluntary control, coordination | 5 | | | | | | | | | | | | | | | | | |
| Motor control and coordination near normal | 6 | | | | | | | | | | | | | | | | | |

# Control Group

| | Section-A Demographic Variables Data | | | | | | | Section-B Disease Related Information | | | | | | Burn Strom's Statistics Motor Recovery | | Modified Asaworth Scale of Muscle Spasticity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S.No | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Pre-Test | Post-Test | Pre-Test | Post-Test |
| 1 | 3 | 1 | 4 | 4 | 2 | 2 | 3 | 1 | 2 | 3 | 2 | 3 | 4 | 2 | 3 | 1 | 2 |
| 2 | 4 | 2 | 1 | 2 | 1 | 3 | 3 | 1 | 3 | 3 | 2 | 3 | 5 | 1 | 3 | 1 | 1 |
| 3 | 3 | 2 | 3 | 1 | 3 | 5 | 2 | 1 | 1 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 3 |
| 4 | 4 | 2 | 1 | 1 | 1 | 4 | 2 | 1 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 2 |
| 5 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 3 |
| 6 | 3 | 1 | 1 | 2 | 3 | 4 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 2 | 3 | 2 | 3 |
| 7 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 2 | 3 | 1 | 2 |
| 8 | 3 | 1 | 1 | 2 | 2 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 3 | 1 | 3 | 1 | 2 |
| 9 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 2 | - | - | 2 | 2 | 3 | 1 | 1 | 1 | 2 |
| 10 | 4 | 1 | 3 | 1 | 5 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 3 | 2 | 1 | 2 | 1 | 4 | 1 | 2 | - | - | 1 | 1 | 2 | 1 | 3 | 1 | 2 |
| 12 | 4 | 2 | 3 | 1 | 1 | 4 | 1 | 1 | 1 | 3 | 3 | 3 | 4 | 2 | 3 | 1 | 2 |
| 13 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 1&2 | 3 | 1 | 2 | 1 | 2 | 2 | 2 | 2 |
| 14 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 1 | 2 | 1 | 2 | 3 | 4 | 1 | 2 | 1 | 2 |
| 15 | 4 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 |
| 16 | 2 | 1 | 1 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 2 |
| 17 | 3 | 1 | 1 | 3 | 3 | 4 | 2 | 1 | 3 | 3 | 1 | 2 | 5 | 2 | 3 | 2 | 2 |
| 18 | 2 | 1 | 1 | 5 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 3 |
| 19 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 3 | 2 | 2 | 1 | 2 |
| 20 | 3 | 1 | 1 | 2 | 2 | 3 | 1 | 1 | 3 | 2 | 1 | 3 | 4 | 2 | 2 | 1 | 2 |
| 21 | 3 | 1 | 1 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 22 | 4 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 4 | 1 | 2 | 1 | 1 |
| 23 | 2 | 2 | 1 | 2 | 1 | 3 | 3 | 1 | 1 | 3 | 1 | 3 | 2 | 1 | 2 | 2 | 3 |
| 24 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 3 | 1 | 1 | 1 | 2 |
| 25 | 3 | 1 | 1 | 2 | 3 | 4 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 |
| 26 | 3 | 1 | 4 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 2 |
| 27 | 2 | 1 | 1 | 5 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 2 |
| 28 | 4 | 1 | 3 | 1 | 5 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 29 | 3 | 1 | 1 | 2 | 3 | 4 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 3 | 1 | 2 |
| 30 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 2 | - | - | 2 | 2 | 3 | 1 | 1 | 1 | 2 |

# <u>ஆய்வு தகவல் தாள்</u>

**<u>ஆராய்ச்சி தலைப்பு:</u> பக்கவாத நோயினால் ஏற்படும் கைத்திறன் செயல் இழப்பு குறைபாட்டை நீக்குவதற்கு கண்ணாடி பிம்பப் பயிற்சி மூலம் சிகிச்சை அளித்து கைசெயல்திறனை அதிகப்படுத்தல் பற்றிய ஆய்வு.**

ஆய்வாளர் : துரைராஜ் ஜோதி சுப்புலெட்சுமி

பங்கேற்பாளர் :

தேதி :

வயது/பால் :

பங்கேற்பாளர் எண் :

ஆய்வாளர் மேற்கொள்ளும் ஆராய்ச்சியில் பங்கேற்க யாருடைய காட்டாயமுமின்றி முழுமனதுடனும் சம்மதிக்கலாம். இதில் பங்கேற்பதன் நோக்கம். இந்த ஆராய்ச்சியில் தகவல்களை தெரிந்து கொள்வதற்காகவும், அதனை பயன்படுததுவதற்காக மட்டும் தான்.

இந்த ஆராய்ச்சியின் நோக்கம், பக்கவாத நோயாளிகளுக்கு ஏற்படும் கைசெயல்திறனை அதிகப்படுத்தலாம் என்பதே ஆகும்.

**ஆராய்ச்சி மேற்கொள்ளும் முறை**

இந்த ஆராய்ச்ச்சியில் பக்கவாதம் நோயாளிகளுக்கு ஏற்படும் கைசெயல்திறனை அதிகப்படுத்த 15 முதல் 20 நிமிடங்கள் வரை கண்ணாடி பிம்பப் பயிற்சி தினமும் இருவேளை செய்யவேண்டும்.

**இதனால் ஆய்வாளருக்கான பயன்**

இந்த ஆய்விற்குபின் பக்கவாத நோயாளிகளுக்கு கைசெயல் திறன் அதிகரிப்பதை அறியலாம்.

**இதனால் பங்கேற்பாளருக்கான பயன்**

இந்த ஆய்வு பக்கவாத நோயாளிகளுக்கு கைசெயல்திறனை அதிகரிக்கும். மேலும் இந்த ஆராய்ச்சியில் பங்கேற்கவில்லையென்றாலும் உங்களின் சராசரி வாழ்க்கை முறை,மருத்துவரின் ஆலோசனை மற்றும் சிகிச்சை முறையில் எந்தவித மாற்றமும் ஏற்படாது என்பதை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பங்கேற்க விருப்பம் இல்லையென்றால் உங்களின் முழுமனதுடன் நீங்கள் இந்த ஆராய்ச்சியில் இருந்து விலகிக் கொள்ளலாம் என்பதை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் உங்களின் மருத்துவ தகவல்களை பாதுகாப்பாக வைத்துக் கொள்கிறேன் என்பதை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியின் தகவல்களை வெளியிடும் போது, உங்களை பற்றிய அடையாளங்கள் வெளிவதாது என்பதை உறுதி கூறுகிறேன்.

**ஆய்வாளரின் கையொப்பம்**
**தேதி**

**பங்கேற்பாளர் கையொப்பம்**
**தேதி**

# <u>ஆய்வு தகவல் தாள்</u>

**<u>ஆராய்ச்சி தலைப்பு:</u> பக்கவாத நோயினால் ஏற்படும் கைத்திறன் செயல் இழப்பு குறைபாட்டை நீக்குவதற்கு கண்ணாடி பிம்பப் பயிற்சி மூலம் சிகிச்சை அளித்து கைசெயல்திறனை அதிகப்படுத்தல் பற்றிய ஆய்வு.**

ஆய்வாளர் பெயர் : துரைராஜ் ஜோதி சுப்புலெட்சுமி

பங்கேற்பாளர் பெயர் :

தேதி :

வயது/பால் :

ஆய்வாளர் மேற்கொள்ளும் ஆராய்ச்சியில் பங்கேற்க யாருடைய கட்டாயமுமின்றி முழுமனதுடன் சுயநினைவுடன் சம்மதிக்கிறேன்.

ஆய்வாளர் மேற்கொள்ள போகும் பரிசோதனைகளை மிக தெளிவாக விளக்கிக்கூறினார்.

எனக்கு விருப்பமில்லாத பட்சத்தில் ஆராய்ச்சியிலிருந்து எந்நேரமும் விலகலாம் என்பதையும் ஆய்வாளர் மூலம் அறிந்து கொண்டேன்.

இந்த ஆராய்ச்சியி ஒப்புதல் கடிதத்தில் உள்ள விவரங்களை நன்கு புரிந்துகொண்டேன். எனது உரிமைகள் மற்றும் கடமைகள் மூலம் விளக்கப்பட்டது.

நான் ஆராய்ச்சியாளருடன் ஒத்துழைக்க சம்மதிக்கிறேன். எனக்கு ஏதேனும் உடல் நலக்குறைவு ஏற்பட்டால் ஆராய்ச்சியாளரிடம் தெரிவிப்பேன்.

நான் வேறு எந்த ஆராய்ச்சியிலும் தற்சமயம் இடம்பெறவில்லை என்பதை தெரிவித்துக்கொள்கிறேன்.

இந்த ஆராய்ச்சியின் தகவல்களை வெளியிட சம்மதிக்கிறேன். அப்படி வெளியிடும்போது என் அடையாளம் வெளிவராது என்பதை அறிவேன்.

எனக்கு இந்த ஒப்புதல் கடிதத்திறன் நகல் கொடுக்கப்பட்டது.

**ஆய்வாளரின் கையொப்பம்** **பங்கேற்பாளர் கையொப்பம்**

**தேதி** **தேதி**

# CERTIFICATE OF ENGLISH EDITING

## TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation work **"A STUDY TO ASSESS THE EFFECTIVENESS OF MIRRORTHERAPY ON UPPER MOTOR FUNCTIONS AMONG STROKE PATIENTS ADMITTED IN RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI."** done by Mrs.DURAIRAJ JOTHI SUBBULAKSHMI II year M.Sc (N) student, College of Nursing, Madras Medical College, Chennai-03 is edited for English language appropriateness.

SIGNATURE : 

DESIGNATION : B. T. Asst.

SEAL :

R. PADMA, M.A., B.A., B.Ed.,
B.T. Assistant (English)
P.U.M. SCHOOL
Thenambakkam, Kanchipuram District
Pin-631 501

# Mirrior therapy procedure

**Mirror therapy**:

**Definition :**

Mirror therapy is a physical rehabilitation measure which uses a mirror of size 20cm width and 30cm length. Patients are instructed do range of motion exercise with distal joints of affected hand in front of mirror for 15 to 20 minutes two time a day for 14 days .

**Purposes:**

- To increase the muscle tone.
- To increase the muscle spasticity.
- To improve the hand functions of patients for activities of daily living.

**Preparation of patients**:

- Explain the procedure to the patients
- Obtained informed consent from the patient
- Arrangement of the articles
- Mirror box, sponge ball
- Table, chair for patient to sit

**Procedure:**

- Explain the procedure to the patients
- Obtain consent from the patients
- Make the patients in comfortable position
- Pre assessment of muscle tone and muscle spasticity
- Mirror therapy is given to the clients for 15 to 20 minutes with hand function exercises (wrist exercise like flexion extensions, abduction.aduction).
- Instruct the patient to do the procedure gently.
- Repeat the procedure until the 14 th day for post assessment.

**MODIFIED ASHWORTH SCALE**

**Name of the patient:**
**Age:** **Sex:**
**I.P No:**

| Muscle tone | Grade | No of days | | | | | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Pretest | Posttest |
| No increase in muscle tone | 0 | | | | | | | | | | | | | | | | |
| Slight increase in muscle tone manifested by a catch and release | 1 | | | | | | | | | | | | | | | | |
| Slight increase in muscle tone manifested by catch minimal resistance (less than half) | 2 | | | | | | | | | | | | | | | | |
| More marked in muscle tone through most of ROM | 3 | | | | | | | | | | | | | | | | |
| Considerable increase in muscle tone, passive movement difficult | 4 | | | | | | | | | | | | | | | | |
| Affected part(s)rigid in flexion and extension | 5 | | | | | | | | | | | | | | | | |

## பகுதி-ஆ : மருத்துவக் காரணிகள்

1) நீண்ட நாள்பட்ட உடல் ரீதியான ஏதாவது உள்ளதா?

அ) ஆம் ☐

ஆ) இல்லை ☐

2) நீண்ட நாள்பட்ட உடல் ரீதியான நோய்

அ) உயர் இரத்த அழுத்தம் ☐

ஆ) இருதய நோய் ☐

இ) நீரிழிவு நோய் ☐

3) எவ்வளவு காலமாக நோய் உள்ளது?

அ) ஒரு வருடம் ☐

ஆ) ஒரு வருடத்திற்கும் குறைவாக ☐

இ) 5 வருடங்களுக்கு மேலாக ☐

4) பக்கவாதத்தினுடைய பக்க விளைவுகள் என்ன?

அ) செயல் இழப்பு ☐

ஆ) செயல் குறைபாடு ☐

இ) நிரந்தர குறைபாடு ☐

5) உணவு பழக்கவழக்கம்

அ) சைவம் ☐

ஆ) அசைவம் ☐

இ) இரண்டும் கலந்த உணவு

6) பக்கவாதத்திற்கான காரணம் என்ன

அ) இரத்த அழுத்தம் ☐

ஆ) பரம்பரை ☐

இ) புகைப் பிடித்தல்/மது அருந்துதல் ☐

ஈ) இருதய நோய் ☐

உ) மூளை நரம்பு மண்டல பாதிப்பு ☐

## பகுதி-அ : சமூகக் காரணிகள்

1) வயது வருடங்களில்

அ) 25 முதல் 35 வரை ☐

ஆ) 35 முதல் 45 வரை ☐

இ) 45 முதல் 55 வரை ☐

ஈ) 55க்கு மேல் ☐

2) பாலினம்

அ) ஆண் ☐

ஆ) பெண் ☐

இ) திருநங்கை ☐

3) திருமண விபரம்

அ) திருமணமானவர் ☐

ஆ) திருமணமாகாதவர் ☐

இ) விதவை ☐

ஈ) மணமுறிவு ஏற்பட்டவர் ☐

4) கல்வித்தகுதி

அ) முறைசாரா கல்வி ☐

ஆ) முதல்நிலைக் கல்வி ☐

இ) இடைநிலைக் கல்வி ☐

ஈ) பி.யு.சி. ☐

உ) பட்டதாரி ☐

ஊ) மற்றவை, குறிப்பிடுக ☐

5) தொழில் சார்ந்த விபரம்

அ) குடும்பத் தலைவி ☐

ஆ) தொழிலாளி ☐

இ) வியாபாரம் ☐

ஈ) அரசு ஊழியர் ☐

6) மாத வருமானம்

அ) ரூ.2000 முதல் ரூ.3000 வரை ☐

ஆ) ரூ.3000 முதல் ரூ.4000 வரை ☐

இ) ரூ.4000 முதல் ரூ.5000 வரை ☐

ஈ) ரூ.5000 முதல் ரூ.10000 வரை ☐

உ) ரூ.10000 க்கு மேல் ☐

7) மதம்

அ) இந்து ☐

ஆ) முஸ்லிம் ☐

இ) கிருஸ்துவர் ☐

ஈ) மற்றவை, குறிப்பிடுக ☐